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Coal Cutting Machinery.

[The following notes are, for the most part, translated and condensed from a recent German monograph.]

THE uncertainty and, in some cases, the actual lack of laborers, rather than high wages, have caused the desire to cut coal by machinery, and doubtless in this, as in other industries, machinery will in time largely replace manual labor.

About the middle of the last century, one MICHEL MENZIES made some unsuccessful attempts in this direction, and since then the number of patents taken for coal cutting and breaking machines has been enormous, though but few of them attained any practical results. Most of these machines aim at doing the same kind of work, namely, cutting a groove 2½ to 3 inches in width and about 4 feet in depth, parallel with the floor of the bed. All the machines are placed on a low wagon with four wheels, running on a track laid along the face of the coal.

In the Paris Exposition of 1867, there were two coal cutters shown; one, the Carret and Marshall, worked on the principle of a metal slotting machine, cutting a horizontal groove into the coal. This plan seems to be impracticable, and nothing more has been heard of the machine.

The Firth machine consisted of a pick worked by a piston, which communicated to it strokes forward and backward in a horizontal plane, in imitation of hand labor. This apparatus has managed to hold its own, though it has not gained much ground. Several other systems have been proposed since 1867.

Coal cutting machines are of three types:

I. Those in which the coal is cut by a revolving horizontal disc, on the periphery of which are set steel teeth or chisels.

II. Machines in which the disc is replaced by a flat endless chain passing over two pullies and having in its joints cutting teeth which work after the manner of tools used for planing metals.

III. Machines in which a horizontal row of drills bore holes into the coal, so near together as practically to form a groove.

IV. Machines imitating the movement of a pick in the miner's hand. (Firth machine.)

A Mr. SIMPSON sought to use diamonds instead of steel for cutting, as in the diamond rock boring machines (LESCHOT'S Patent), but the softness of coal makes the use of diamonds unnecessary.

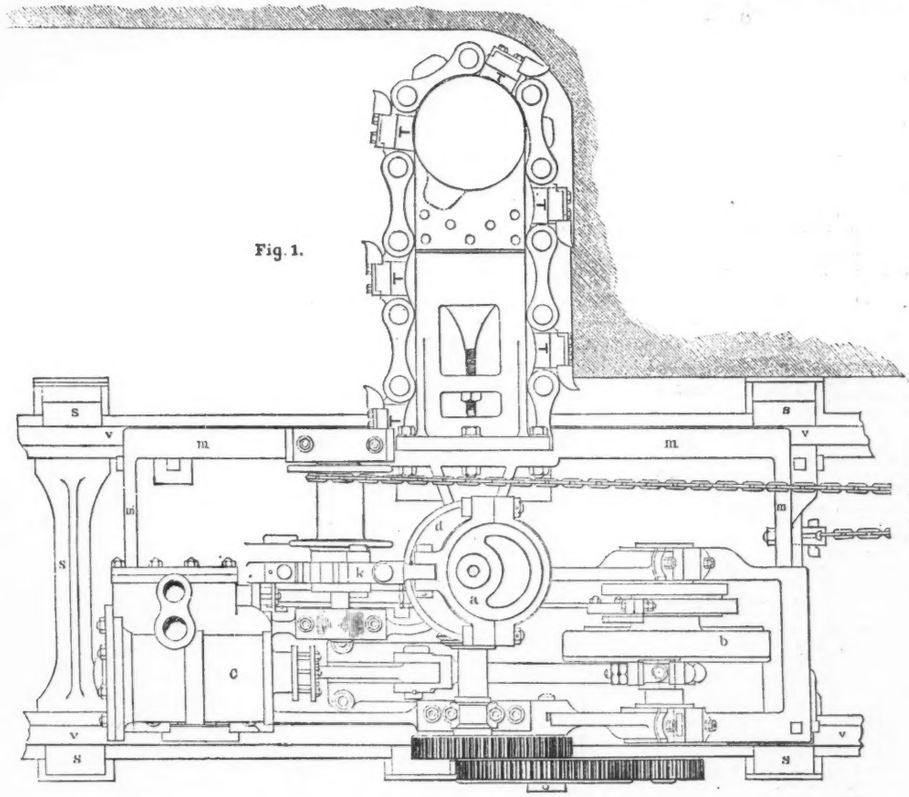
In our American coal cutter (BROWN'S Patent), of which we recently (Vol. XIX., p 97) published a description and full illustrations, we have, probably, the best example of the 1st type. Among the English machines of this class are the Winstanley, and the Gillot & Copley, which we will have occasion to refer to on another occasion.

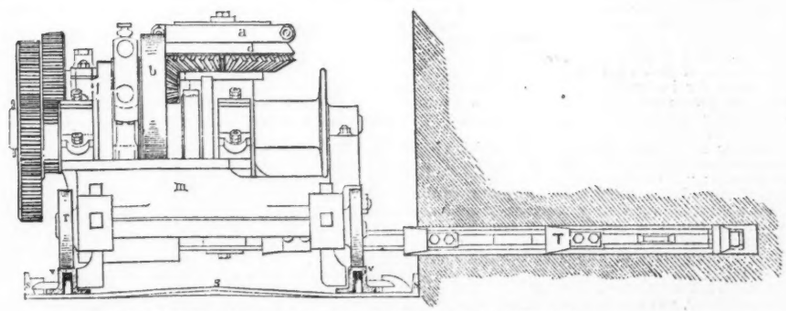
We also illustrated (Vol. XVIII., p. 305) CLAPP'S coal cutter, an example of the 2d type.

The Gartsherrie or Gleadhill's Coal Cutter.—This machine takes its name from the well-known Gartsherrie Iron Works, where it was invented, and has been improved and used for nine or ten years in the Espie colliery belonging to that firm. Recently a shop has been erected for the exclusive purpose of building these machines. These facts testify to its practical value and success.

The following illustrations are so clear and comprehensive as to need little explanation. The steel cutting edges or teeth are set between the links of an endless chain, which is driven by a compressed air-engine, working with a pressure of 30 to 40 pounds. It is automatically moved by winding up a chain, as in the Brown coal cutter, and cuts a groove, 2¾ to 3½ feet in depth. The average work done by this machine, in actual practice, is 360 to 370 feet in a shift of 8 to 9 hours, though, while working, it will cut 3 feet in 2 minutes, the handling of the machine, occasional falls of coal, and other causes of delay, bringing down the average. The thickness of the coal in the Espie mine is about 34 inches, and the machine cuts from 75 to one hundred tons in a shift. In the next shift,

Fig. 1.





THE GARTSHERRIE OR GLEADHILL'S COAL CUTTER.

this coal is removed; and in the third, it cuts a fresh groove. The coal bed has an inclination of 1 in 4, the machine in one shift working up the pitch, in the other down. It requires three men, or one man and two boys, in attendance.

The machine is fastened to a strong cast-iron frame (*m*), 6 feet long 2½ feet wide, moving on four wheels (*v*). The cylinder (*c*) has 8½ inches diameter, 12 inches stroke; the crank-shaft runs in pedestals attached to the frame, and carries also a fly wheel (*b*), and eccentric; on one end of the shaft, and hanging over the side of the frame, is a driving wheel which works through gearing a vertical shaft carrying the chain driving wheel. These gears are all of Bessemer steel and have been found to answer well. The chain carries 9 cutting teeth 2¾ inches wide. Each of these is fastened to a link by two pins. The links of the chain are of forged steel. The arm carrying the chain is bolted to the frame, and is in two pieces, the arm proper and the end piece which is fastened to it with set screws.

The chain which draws the machine along is 5-16 inches thick, and is fastened about 100 feet ahead of the machine. The arrangement of the driving gear is shown in the accompanying drawing. The track rails are of malleable cast-iron, resting on iron ties in such a manner as to be easily fastened by wedges. Each machine has 21 feet of such rails in 7 lengths of three feet, so as to be easily moved.

These machines are built of two sizes; No. 1 is 28 inches high and requires 3 feet vertical height to work in. No. 2 is only 20 inches high including rails.

The speed at which the machine moves forward can be regulated to suit the hardness of the coal. These machines are now used in mining iron ore, which rests on a hard sandy fireclay, and are said to do the work satisfactorily.

Of the three men in attendance on the machine, one is occupied principally in carrying the rails from behind to before the machine, and another in setting the rails. The cutting teeth are sharpened every shift, when the whole chain is taken off and brought out of the mine.

This machine has attracted more attention and is, we believe, more extensively used than any other coal cutter in England; the Gartsherrie works have some 8 or 10 of them in constant operation; the Hetton Coal Company, in the North of England, has also several at work.

They are more complicated than either the Firth or Winstanley or our own Brown machine, and while they have undoubtedly demonstrated the fact that there is a practical economy in their use over manual labor, yet they do not appear to be of that construction that promises any great future improvement.

Unconstitutionality of the Tax on Coal.

AN important and interesting opinion was filed by Judge PEARSON, of the Dauphin County Court, on Wednesday. He decided the existing tax on coal to be unconstitutional. The Attorney-general of the Commonwealth has filed exceptions, and as the case will be taken to the Supreme Court, Judge PEARSON's views cannot be regarded as binding until they are affirmed by a higher tribunal. It is probable, however, that his decision will not be overruled, and a brief outline of its leading features may prove interesting to our readers. The defendant was the Kittaning Coal Company, which mined nearly nineteen thousand tons of bituminous coal in Clearfield County, Pennsylvania, during a period of a little more than two months, preceding June 30, 1874; and after making the appropriate returns of this product to the Auditor-general, it was assessed at $586.65, this being the sum due under a law passed in 1874, which requires coal companies to pay an additional tax on their corporate franchises at the rate of three cents upon each and every ton of 2,240 pounds of coal mined or purchased, and provides that the amount of coal consumed in the business of such companies shall be exempted from such returns. The defendant made four points, three of which were overruled, but a judgment was, nevertheless, entered against the commonwealth on the facts proved and a portion of the theory of the single point which was partly affirmed. It was as follows:

"Third, The imposition of the tax by the statute in question upon all coal mined or purchased by the enumerated corporations, except that used in their business, and the omission to impose the tax on the coal of individuals and partnerships are in effect an exemption of the coal of the latter, as well as that so used, from taxation. Such exemptions are prohibited by the constitution, and the statute making them is unconstitutional and void." The exemption declared to be unconstitutional was not the failure to tax the coal mined by individuals and partnerships, but the failure to tax the coal consumed by the companies in the transaction of their business. The Judge said, in substance, that this clause exempted at least 500,000 tons from taxation, and he pointed out that companies which desired or intended to use large quantities of coal in the manufacture of iron or for other purposes might, by availing themselves of the privileges granted, mine coal without paying any tax whatever, while the companies which mined coal for the purpose of selling it to general consumers were taxed, and this he pronounced a violation of the provisions of the new constitution, which forbids laws exempting any property from taxation, except certain classes of property enumerated, such as churches, cemeteries, etc. One of the remarks of the Judge, in this portion of his opinion, is forcible and noteworthy, not merely for its bearing on this case, but on taxation in general. He said "the theory of government is that no more taxes are imposed than are necessary to meet the public wants, and for every article which escapes taxation an additional burthen has been thrown on others."

Another interesting feature of the decision is the light it sheds upon the general management and the magnitude of the varied coal interests of Pennsylvania. The Judge said: "We further find that the whole product of coal mined in the State of Pennsylvania during the year 1874 was 32,147,040 tons, of which 7,712,461 was bituminous, 2,303,491 was semi-bituminous, 500,000 block, and 21,631,118 was anthracite,* as per the report of Mr. BINGHAM, Commissioner of Statistics, given in evidence by agreements *pro ut* report in full. We further find that about six-sevenths of the bituminous coal mined in the State is by individuals. Of the anthracite coal we find that considerably over one-half is mined by incorporated companies. The whole tax assessed on all of the incorporated companies during 1874 amounted to nearly $500,000, and that not more than one-half of the coal mined in the State is taxed. We also find that there is a drawback or exoneration of the coal used by the various companies in all of the branches of their business, of about 500,000 tons, which is relieved from taxation by the act of 1874, already cited, *pro ut* said act. The price of bituminous coal during the period for which the tax under consideration was imposed was from eighty cents to one dollar per ton in different parts of the State; block coal was worth $1.30. The average price of ordinary bituminous was about ninety cents per ton at the pit's mouth loaded in the cars. The royalty paid was eight to fifteen cents per ton, an average of twelve cents. The cost of mining anthracite coal varied from about three to four dollars per ton during the same period, say an average of $3.50 per ton on the cars at the mines.* The royalty paid is thirty to sixty cents, say an average of forty-five cents per ton and for mining $1.75 to $2 per ton."—Philadelphia *Record*.

* It will be noted that Mr. BINGHAM, the Pennsylvania Commissioner of Statistics, adopts as his official figures the reports of the ENGINEERING AND MINING JOURNAL. The court also accepts them as correct. If, therefore, there is any virtue in "official" figures, we can claim it. Our report gives 21,667,386 tons less Sullivan County anthracite 30,208=21,631,118 tons—as above. The Commissioner makes an error in omitting Sullivan County coal. In composition it is a true anthracite, and it is so classed in market, though in its appearance it resembles the semi-bituminous coals.—ED. E. AND M. J.

* The figures $3 to $4 per ton for mining anthracite are very much too high; it costs, royalty included, say $2 to $2.25 per ton on the cars.—ED. E. AND M. J.

Influence of Silica, Sulphur, Phosphorus and Manganese on the Qualities of Iron.

By RICHARD AKERMAN, of the Stockholm School of Mines.

IRON AND SILICA.

The taking-up of Silica by Iron.—When iron-filings are fused together with silicic acid and charcoal powder, the silica is reduced and combines with the iron; and though the taking up of the silica increases with the degree of heat, it is not necessary for bringing about such a combination that the temperature be raised to the point of fusion of the iron, but some silica is taken up by the iron when exposed to a strong red heat, if, when so exposed, it is imbedded in a mixture of silicic acid and charcoal powder (1).

If the iron itself contains carbon to any considerable amount, any addition of charcoal is not at all necessary for the taking up of silica, at least, when the temperature is so high that the iron is fused; but if iron containing carbon is kept in a fused state in contact with silicic acid, silica is reduced and taken up by the iron, carbonic oxide being formed at the same time (2). The longer steel, when it is melted, is kept fused in clay crucibles, the more silica is reduced from the crucible, with disengagement of carbonic oxide, and united with the steel (3).

Though silica is much more difficult of reduction than iron, it may finally be asked if pure iron, when the temperature is high enough, has not also power to reduce some silicium from silicic acid. A part of the iron would naturally in this case combine with the oxygen separated from the silicic acid, to form protoxide of iron, which would next unite with another portion of silicic acid to form silicate of protoxide of iron. To judge by BOUSSINGAULT's experiment (4), this appears to be actually the case, for he is said to have produced iron with more than 0·5 per cent. silica merely by keeping malleable iron fused in a Hessian crucible without the addition of charcoal or any other substance. On the other hand, PERCY has not succeeded in getting iron to take up any silica in this way, having attempted in vain, not only by the above-mentioned, but also by two other methods, to produce iron free from carbon and containing silica (5); but such combinations can nevertheless be brought about in several ways, as will shortly be seen.

Iron can take up much more Silica than Carbon.—The higher the temperature and the longer the heating is continued, the more silica, other circumstances being the same, is taken up by the iron, which can combine with much more silica than carbon. Thus PERCY (6), by strongly heating a mixture of oxide of iron, charcoal powder, and silicic acid, produced a metallic regulus with as much as 13·78 per cent. silicium, and in another experiment (7), by fusing sulphuret of iron with silicic acid and charcoal, he obtained an iron with 18·77 per cent. silica. Further, MRÁZEK (8), by subjecting to a strong heat, in a closed Hessian crucible, fine iron wire in mixture with silicic acid, fluor spar and metallic sodium, has produced silicious iron with 7·42 per cent. silica. Pure silicious iron, with 20·17 per cent. silica in one case, and 30·51 per cent. in another, has also been prepared by HAHN (9), by fusing chloride of iron and sodium in one case with silica, sodium, and fluor spar, and in another with silico-fluoride of sodium and sodium. CARON (10) also states, that by fusing together iron and free silica, these substances may be made to unite in any proportions whatever. But, on the other hand, nobody has succeeded in making iron take up much more than 5 per cent. carbon.

Iron can also take up Silica from Earthy Silicates.—Also, if to a mixture of oxide of iron, charcoal powder, and silicic acid, are added earthy bases (lime, magnesia, etc.,) with which silicic acid forms fusible combinations, or slags, the iron obtained, after the necessary heating, contains silica, but less in the same proportion as the amount of the earthy bases in the mixture is greater in relation to the silicic acid, or the more basic the slag happens to be, and the lower the temperature employed during the experiment.

SILICA IN PIG IRON.

As furnace charges always contain silica, and no pig iron, consequently, is ever formed without coming in contact with silicic acid and carbon while in a state of fusion, it is evident, from what has been stated above, that all pig iron must contain some silica, and that the quantity of silicium it contains is greater in proportion as the temperature in the furnace has been higher, and the charge employed in the production of the iron has been more acid.

Coke-made Pig Iron richer in Silica than Charcoal Pig, and Gray Pig richer in Silica than White produced from the same Materials.—A higher temperature

(1) Karsten, Eisenhüttenkunde, 3te Ausg., Th. 1, p. 477.
(2) Caron. "Comptes Rendus," T. 62, p. 295.
(3) Bessemer. "The Journal of the Iron and Steel Institute, 1871." Vol. I, p. 44.
(4) Karsten, Eisenhüttenkunde, 3te Ausg., Th. 1, p. 479.
(5) "Metallurgy, Iron and Steel," p. 91. Percy-Wedding, Eisenhüttenkunde. Abth. I., p. 116.
(6) "Metallurgy, Iron and Steel," p. 93; Percy-Wedding Eisenhüttenkunde, Abth. 1, p. 118.
(7) "Metallurgy, Iron and Steel," p. 38. Percy-Wedding Eisenhüttenkunde. Abth. 1, p. 48.
(8) "Berg-und Hüttenmännisches Jahrbuch der k. k. Bergakademien," Bd. XX., p. 414.
(9) "Annalen der Chemie und Pharmacie," Bd. 129. p. 71.
(10) "Comptes Rendus," T. 52. p. 1190.

favors the formation of grey pig iron, and, in addition, the combination of silicium with the iron; it is, consequently, easy to understand that grey pig, in general, contains more silica than white made from the same materials, and that charcoal pig commonly contains much less silicium than coke-made pig, both because the temperature in coke furnaces is in general higher than in charcoal furnaces, and because the ash contained in coke is much greater in quantity, and richer in silica, than that contained in charcoal.

White charcoal pig contains commonly between 0·1 and 0·4 silica, but in large-grained white pig, produced with the lowest possible temperature in the furnace, and in the so-called "geting jern" obtained when the furnace is working badly on account of an excess of ore, only a trace of silica is sometimes to be found. Spiegeleisen, which of the white pig varieties requires the highest temperature in the furnace, on the contrary, not seldom contains nearly 1 per cent. silica, and R. RICHTER (11) has found as much as 2·732 per cent. silica in a spiegeleisen from Theresienthal, with 22 183 per cent. manganese, while the amount of carbon which it contained was only 2·311 per cent.

The least amount of silica which has been found in any grey pig-iron at the Stockholm School of Mines has been 0·2 and the greatest 2·7 per cent., but it is comparatively seldom, and only in some varieties of cast iron, that it much exceeds 1 per cent. in any Swedish pig. Coke-made pig, on the contrary, commonly contains up to 2 per cent. silica, but not seldom as much as 4, and RAMMELSBERG mentions a grey coke pig from Hörde, in Westphalia, examined in his laboratory, which contained 7·97 per cent. silica, while PERCY instances one which contained as much as 8·2 per cent. of that substance.

We see it also sometimes stated that in the halved (mirrored) pig-iron in which the grey is sharply distinguished from the white, the *amount of silica contained* in the grey part is greater than in the white; but the analyses made at the Stockholm School of Mines to determine this point have shown that this assertion does not hold good, but that it may as well happen that the amount of silica in the white part is somewhat larger than in the grey. For example, I have found, as the mean of three analyses agreeing well with each other, the amount of silica in a "halved" pig made from Winkharn ore to be in the white part 0·193 and in the grey, only 0 162 per cent.

THE INFLUENCE OF SILICA ON THE AMOUNT OF CARBON IN PIG IRON.

It has already been stated that a high temperature at the production of pig-iron at the same time favors a more abundant combination of silica with the iron, and a more plentiful separation of graphite in the cooled pig; but it may also be a question whether the disposition of the iron to take up carbon is not diminished in the same proportion as it combines with more silica, for the coke-made varieties of pig-iron rich in silica do not in general contain more than 2 to 3·5 per cent. carbon in all, while charcoal pig commonly contains 3·5 to 4 5 per cent., and it has also been observed at charcoal furnaces that the pig-iron is richer in carbon the more basic the charge is kept.

The influence of silica in this respect is, however, by no means certainly demonstrated, for the first-named circumstance may, indeed, as well follow from coke having less power than charcoal to make iron combine with carbon, and the second circumstance may also be caused by the heat of the furnace being often greater when the charge is more basic, in consequence of the slag being fused with greater difficulty than when the charge is more acid. But that silicious iron and carbon iron have no great disposition to combine with each other appears from an experiment made by MRÁZEK, in which he heated, in a well-closed clay crucible during thirty-five minutes' moderate blowing in a Sefström furnace, two parts of the silicious iron referred to above (containing 7·42 per cent. silica) together with three parts by weight of pure carbon-iron (containing 5·04 per cent. carbon) produced by fusing iron wire in a crucible with lamp-black. For protection against oxidation, there was added a mixture of equal parts of cryolite, fluor spar and quartz, from which was obtained a very fluid slag when it was subjected to the blast. The compounds of iron were supposed at the first examination to have been fused, but a closer inspection showed that this was the case only with the carbon-iron, and that the piece of silicious iron, though surrounded by the fused pig-iron, was still quite as sharp-cornered as when it was laid in the crucible. When it is added that this silicious iron, though not so fusible as pig-iron, was yet more easily fused than steel of middling hardness, it is evident, from the circumstance just referred to, that carbon-iron and silicious iron have no great attraction for each other, and it is thought that the further conclusion may be arrived at that silica in combination with iron must diminish its disposition to take up carbon.

Yet more certain and incontrovertible is it that the silica combined with iron favors the separation of the carbon as graphite when the pig-iron cools, or in other words, that the more silica a pig-iron contains the less is the power of the iron to retain carbon in combination with it. Thus, the combined carbon and the silica may, it is thought, to some extent replace each other in combination with iron.

We have a very clear proof of this in the furnace process, in that a basic sulphur-free charge, which with a middling consumption of charcoal only yields white pig-iron, after the admixture of so large a quantity of quartz that the amount of silica in the irom is somewhat increased, may easily be made to yield grey iron.

Another reason for the view just stated leading to the same conclusion, is the circumstance that if grey pig-iron is refined, whereby silica, but no considerable quantity of carbon, is removed, it is after cooling generally white, which consequently shows that if silica is removed the iron has power to retain more carbon in combination than when its content of silica is greater.

Finally, PERCY gives an account of an experiment affording strong corroboration of this view. Powdered spiegeleisen with 5·39 per cent. manganese and 0·37 silica was mixed with one-fifth of its weight of silicic acid, and the mixture was afterwards heated for an hour to a white heat in a covered clay crucible. The product thus obtained was well fused, and consisted of a button of pig-iron with a little slag over it. The button was dark grey in fracture and contained 1·61 per cent. graphite, 2·91 per cent. silica, and 0 60 per cent. manganese. The amount of combined carbon was not ascertained directly, but PERCY thinks that from the examination made he may conclude that it was very small. It thus appears that the fusion of the white pig-iron, rich in manganese, with silicic acid brought about reduction of silica, which, again, must certainly have taken place at the cost of manganese and carbon, which were oxidised—the first to oxide of manganese which formed a slag with the unreduced silicic acid, and the latter to carbonic acid which escaped. As the amount of carbon diminished, the iron must have been able to retain the remainder so much the more easily, but not the less on that account did the pig-iron become grey, and if this separation of graphite was also to some extent facilitated through the diminution of the amount of manganese, it must yet, also, when the percentage of carbon was so small, have been the natural consequence of the power of the iron to retain the carbon in the combined state having been diminished by the taking up of silica.—*Iron.*

(11) "Berg-und Hüttenmännisches Jahrbuch," Bd. XI., p. 205.

TO BE CONTINUED.

Notes.

General Strike of Heaters and Feeders at the Wheeling Mills.—WHEELING April, 20. The Pittsburgh boilers having accepted $5.50 per ton, fifty cents less per ton than their old wages, necessitated a similar reduction here. The boilers here then demanded a reduction from their heaters of one-third of their old wages, two dollars. They resisted and struck. The nail feeders have been in the habit of receiving half of what the dealer receives on each keg. They demanded three-fifths and struck. The Top mill helpers and feeders struck first, without notice to the others, but to-night all the mills had a meeting, with the exception of La Belle, and determined to go into the strike.

The Staffordshire and West Yorkshire Co-operative Company, have taken possession of the Halmerena colliery, near Audley. Some time ago, they paid £1500 of the stipulated deposit of £3000. The remaining £1500 is now in hand, and as soon as the necessary legal documents are prepared, will be deposited in part payment of the total purchase money, £13,000. On Monday last, at their annual meeting, the Wolverhampton Stocklock Makers showed nearly £300 net profits, £130 of which they divided as bonus on wages, and £34 as interest on shares, £115 being carried to depreciation of machinery. The operatives' subscribed capital is £830; seventy-five co-operatives are employed at higher wages than were ever before given, and they will have a 10 per cent. increase in a month. Anticipating that rise, the locks are raised 5 and 10 per cent. An encouraging stimulus to co-operative industry in the Black Country has been given by the recently published report of the Walsall Co operative Lock Factory, which shows a return of something like 50 per cent. upon the capital invested. The wrought iron tube makers now on strike at Wednesbury are turning their attention to co-operative industry as the best solution of the dilemma to which they and their employers find themselves reduced.

The Co-operative Movement.—The progress which the principle of co-operation is making in England is shown in the increasing number and importance of the annual co-operative congresses. The seventh of these met recently, and was attended by delegates from all parts of the country, representing a numerous constituency and a very large capital. At present these societies are chiefly engaged in distribution, but there are several, and those both extensive and successful, which devote their energies to production. Many of the first class commenced with a very limited capital, and, according to the chairman of the Rochdale Pioneers' Society, no more is necessary for a successful start than one or two hundred members and a subscribed capital of £1 a piece. A proof of the immense profits of the retail trade is to be found in the fact that some of the Lancashire societies have in a few years, besides paying their dividends, accumulated capital amounting to from £100 000 to half a million sterling. The co-operative societies of Oldham have 12,000 members, and turn over half a million a year. They buy their own grain and grind their own flour to the value of from £250,000 to £300,000 per annum. From their retail stores they draw an annual profit of £50,000. They have also gone into the cotton trade, and have at the present moment sixty cotton mills, which, when in full operation, they expect will bring them in £400,000 a year. Professor THOROLD ROGERS, who presided, in his opening address contended that trades unions were powerless to hold their own against the concentration of capital in modern society, and maintained that the only remedy and escape from a process by which wealth was more and more concentrated in a few hands was the principle which the congress represented.

The Tallest Chimney in the World.—Mr. R. M. BANCROFT, of the engineers' staff, Great Northern Railway, read a paper on this subject at the last meeting of the Civil and Mechanical Engineers' Society, Westminster Chambers. Mr. BANCROFT (the Vice-president of the society) stated that the tallest chimney in the world is the well-known "Townsend chimney," Port Dundas, Glasgow. It was built by ROB. CORBETT, Esq., of Duke street, Glasgow, for JOSEPH TOWNSEND, Esq., of Crawford Street Chemical Works. The total height from foundation to top of coping is 468 feet, and from ground line to summit 454 feet; the outside diameter at foundation being 50 feet, at ground surface 32 feet, and at top of coping 12 feet 8 inches. The number of bricks used in the erection were as follow: Common bricks in chimney, 1,142,532; composition and fire bricks for inside cone, 157,468; common bricks for flues, etc., 100,000; total, 1,400,000. The weight of bricks at tons per 1000 is equal to 7000 tons. When within 5 feet of completion, the chimney was struck by a gale from the north-east, which caused it to sway 7 feet 9 inches off the perpendicular, and it stood several feet less in height than before it swayed. To bring back the shaft to its true vertical position, "sawing back" had to be resorted to, which was performed by Mr. TOWNSEND's own men, ten working in relays, four at a time sawing, and two pouring water on the saws. The work was done from the inside on the original scaffolding, which had not been removed. Holes were first punched through the sides to admit the saws, which were wrought alternately in each direction at the same joint on the side opposite the inclination, so that the chimney was brought back in a slightly oscillating manner. This was done at twelve different heights, and the men discovered when they were gaining by the saws getting tightened by the superincumbent weight.

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RICHARD P. ROTHWELL, C. E., M. E., ROSSITER W. RAYMOND, Ph. D., } Editors.

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WE understand that the next meeting of the Institute of Mining Engineers will commence on Tuesday, May 25th, at Dover, N. J. Messrs. E S. MOFFATT, E. CANFIELD, and FRED. A. CANFIELD are the Local Committee. Further particulars will be given in the *Bulletin* hereafter. The news reaches us too late for comment. We have only space and time to say that, for many reasons, this is an excellent choice of locality, and promises a delightful meeting. *

IN our last number but one, we gave the name of Mr. A. SHOLLY, as a member of the Government Board for Tests of Iron and Steel. We had never heard of SHOLLY; and naturally we felt humiliated at our ignorance. But that was no reason why we should fail to recognize SHOLLY'S eminence and fitness for the responsible and honorable position to which we supposed he had been appointed. So, with a mighty conquest of ourselves, we "recognized" him, and printed his illustrious name, just as it came to us. Fancy our relief when we discovered that A. SHOLLY stood for A. L. HOLLEY, a gentleman whose appointment to such a duty is so exactly appropriate that we never suspected the Government of having made it! We hope SHOLLY will not be offended when we remark plainly that, in our judgment, HOLLEY is worth a hundred of him. *

THE mirage of gold and silver that has lead unwary capitalists on to *permanent* investments of countless millions in our Western mining regions, has created an absolute need of some reliable source of information as to the actual value of mining property in those districts. To meet this want, mining agencies have been established at different points. At Denver, Col., we have the Colorado Bureau of Mines, and now we have the Colorado Springs Mining Agency, at Colorado Springs, Col., whose advertisement appears in another column. The objects and plan of this agency are excellent, and there remains but one thing to make it actually useful, viz., to live up to its professions, and that we have no doubt it will do.

The rock on which most mining agencies make shipwreck is personal interest of the officers of the association in the properties reported on or sold, some contingent interest not expressed in its regular commission; this defect guarded against, such an agency may do much good and prove a permanent success.

John B. Pearse.

WE learn that the latest Committee of the American Iron and Steel Association has retired from active business in the line of collecting iron ores for the Centennial, and has delegated its powers, with full liberty of personal action, to Mr. JOHN B. PEARSE, a well-known and highly-esteemed member of the Institute of Mining Engineers. And we should not be surprised if Mr. PEARSE, remembering that the former Scientific Commission has never been dismissed, should ask some of them for advice and assistance. Perhaps he has done so already. If so, he will certainly get it; and, being a gentleman, he will certainly thank those who give it, instead of demonstrating, after he has requested and received it, "why it wasn't wanted." Mr. PEARSE, in short, got his knowledge both of science and good manners before he had anything to do with the American Iron and Steel Association.

There never has been a time since Mr. BRITTON began to agitate the subject of a national exhibition of iron ores, fluxes, fuels etc., when we were not heartily in favor of the object, and ready to do anything within our power to help it. If Mr. PEARSE will push it with energy and impartiality, he shall have our cordial support. Whatever salvation there may be in one good deed, wrought upon a deathbed, Mr. MORRELL'S association has earned by this appointment. The past, of course, cannot be altered; but an association, no less than an individual, may be, in the dying hour, reasonably anxious about the future. *

The Miners' Strike.

WE had hoped to have been able this week to record the end of the strike in the Wilkes-Barre region, but, though that will probably soon take place, the men have not yet gone to work. This appears the more incomprehensible, when it is known and admitted by the Wilkes-Barre men, that at the terms offered them, they can make five per cent. better wages than the men of the Delaware and Hudson Canal Company, the Delaware, Lackawanna and Western RR. Co., and the Pennsylvania Coal Co., who are now at work. What the men can hope to achieve by their rejection of better terms than are accepted by their fellow workmen in adjoining mines, is not apparent, though what they are loosing beyond possibility of recovery is very apparent to every one.

In the Schuylkill Region, the men show signs, if not of weakness, let us say of discretion. There has been a proposal to abandon their claim for the $2 75 and $3 00 basis. As they have always been ready to go to work on the $2 50 or last year's basis, this concession does not mean anything. The real points of difference between the men and their employers are the reduction of 20 per cent. on contract work, the rejection of the refuse coal in estimating the basis price of coal, and the placing no minimum limit on the basis price. We have procured the necessary data to calculate the extent of the proposed reduction, and will give the figures next week. With the mines now working, producing about half the coal the market will take, there is no fear of any severe coal famine, and the Combination can undoubtedly carry their point. We are advocates of conciliation and arbitration for the settlement of labor disputes, and believe the present case is not one to which those principles will not apply. As there is no question, that the men will in any event have to submit to a reduction corresponding in some degree to the general decline in wages throughout the country, the wisest policy on their part would be to offer the whole question for arbitration, and abide the result.

Coal Statistics and the Pottsville Miners' Journal.

THE Pottsville *Miners' Journal* is greatly disturbed and enraged by our exposure of its favorite hobby, its coal statistics. Aware of the entire unreliability of the published reports of coal production, we last year took great pains to obtain full weekly or monthly returns of the coal mined throughout the country. As these came in, it was soon evident that the Pottsville paper's weekly reports were quite incomplete. We so stated, and were told, in answer, that it was impossible to give full returns before the close of the year; and that paper continued, throughout the year, to publish, as the total amount of coal sent from the several regions, figures that were in no respect what they pretended to be. The fact that correct reports could be made weekly or monthly, and that the total could be given at the close of the year, when it is of greatest interest, we demonstrated by publishing returns that have since been accepted by the Pennsylvania Commissioner of Statistics, and the Courts of Pennsylvania, as giving correctly the production of anthracite for the year.

Our infuriated contemporary accumulates for our especial benefit a choice vocabulary, which we suppose represents the ultimate reasoning and intellectual capacity, as well as the highest standard of journalistic ethics, of its office. Thus, when we give in detail the figures representing the production of coal, and in courteous terms call attention to the sources of error in its reports, that paper's sole defence or answer is, "black-hearted liar and scoundrel," and other similar epithets. Judging this from the outside standpoint of the courtesy and mutual consideration which characterize the intercourse of gentlemen, (outside the limits of the Pottsville *Journal's* office,) there will be little difference of opinion as to the credit this manner of treating the subject brings to our contemporary or to the cause of journalism in general.

So far as the Pottsville *Journal's* remarks are personal, we can well afford to ignore them, simply remarking, in the interest of accuracy, that "the English Mining Engineer who styled himself Prof. ROTHWELL," does not happen to be an English engineer—though assuredly he would not consider it any disparagement to be such. Yet, like the editor of the Pottsville *Miners' Journal*, he has several times visited England. "This impudent, imported humbug Professor" never accepted the honorable appointment of Professor, except in one of our first American Universities, though he has been tendered it in more than one American technical Institute or College. If the qualifications of good American citizenship and honor to American journalism are to be gauged by the standard of the Pottsville *Miners' Journal* and its rabid editor, then "have we offended." But if honest, independent criticism of frauds and abuses, unbiased advocacy of what we believe to be the true basis of permanent substantial national progress and prosperity; if contributing to the dissemination of that knowledge and those principles which make nations great, constitute honorable American journalism, then the ENGINEERING AND MINING JOURNAL cedes the first place to none.

"British Gold" has long been a disturbing element in the orbit of our provincial contemporary. But a few years ago, its pages were constantly filled with statements of the injury, oppression and general demoralizing influence, the investment of "British Gold" had exercised on the prosperity and well-being of Schuylkill County, in building, and, of course, controlling the Philadelphia and Reading Railroad, the outlet that made the working of the Schuylkill mines possible.

The choice language in which the *Miners' Journal* denounced that corporation is yet familiar to every one. No one, of course, connected the appearance in its columns of Philadelphia and Reading advertising, and other evidences of patronage, with the sudden cessation of abusive hostility on the part of the *Miners' Journal*, nor, of course, did any one attribute the sudden and radical

change in our contemporary's views of the Reading Road to the influence of "British Gold." We merely mention the fact to show what uncharitable persons might have thought, for the circumstances could easily have been made to appear, at least, suspicious. This incident should remind our neighbor how exceedingly careful people who live in glass houses should be about throwing stones.

So far as we are concerned, we regret to say our receipts of "British Gold" have been confined pretty closely to the sum of £1 sterling for each name on our English subscription list; but we beg to assure our Pottsville monomaniac, and hope he will publish the fact to the world, that we shall be delighted to receive, not only British, but also French, German, American, "Heathen Chinee," or any other gold that may be tendered us by Britisher "or any other man," in appreciation of our views on the present needs and future development of the American iron trade. Possibly, if we had the age, and especially *the experience*, of the Pottsville patriot, we might better appreciate the hidden dangers that lie in "British Gold;" but, as we now feel, we must confess we would rejoice to have it not only fill our own coffers, but, in the absence of the American article, even take the place of the depreciated rag money we are now using.

Our contemporary wants us "to show in any particular where our (his) reports are incorrect, doubled up, or a couple of million tons omitted." The task is an exceedingly simple one; and without going into many details or attempting to point out even a tithe of the errors that are concentrated in almost every line of these "statistics," we will grant his desire. The eagerness with which this Pottsville statistician seized on a transparent typographical error in an editorial note, which put the amount of anthracite mined at 26 million tons, though in the same sentence reference was made to the correct figures given in detail, should at least have prevented him from adding *two* typographical errors of his own in printing the sum a second time in the same column, to say nothing of the typos in its own tables, in which it rarely happens that a column will add up to the total given.

The Pottsville *Miners' Journal* gives us the coal from the Wyoming Region sent to market, *via* the Lehigh, as 2,566.557 tons. As there are but two roads, the Lehigh Valley, and the Lehigh and Susquehanna, which run from the Wyoming to the Lehigh, this coal necessarily passed over these roads. Their official reports give—

L. V. RR.	1,046,967 tons.
L. & S. RR.	1,519,590 "
Total	2,566,557 tons, the figures given above.

Now let us see the errors which are made in adopting these.

1st error. The report of the L. V. RR. is for the fiscal year commencing 1st December, 1873; consequently this report gives a portion of the product of 1873 as belonging to 1874, and it omits a month's product of 1874. The product of the month of December in the two years is not the same, and consequently the report is in error. The L. & S. RR. reports commence with the 1st of January.

2d error. The L. V. report includes in the above a small amount of Sullivan County coal which not only is not Wyoming coal, but which the Pottsville *Journal* does not even admit to be anthracite; yet it commits the error of including it in its report.

3d error. Of this 1,046,967 tons, the L. V. RR. delivered 109.868 tons to the L. & S. RR. at Sugar Notch. This is consequently included again in the L. & S. RR. report, and is counted over twice in these statistics. This is what we mean by "doubling up."

4th error. The Pottsville paper gives the amount of Wyoming coal going over Lackawanna and Bloomsburg RR. as 173,663 tons. This omits altogether 266,318 tons shipped over that road from the Susquehanna Coal Company's mines. This is what we mean by "omitting."

5th Error.—Our Pottsville statistician altogether omits 57,596 tons of Wyoming coal taken direct from the mines by the P. and N. Y. RR. and not included in any other report—another case of "omission." In the same way we might go through every line of his reports, pointing out errors of omission or addition, did we have the time, space, or inclination to do so.

In the Lehigh coal, he apparently omits about half a million tons, besides putting Mahanoy coal, which goes down the Lehigh, and is marketed as Lehigh, in the Schuylkill region, to which it belongs geographically.

There is an item of 792,783 tons under the heading "Lehigh Canal," when it is well known that not a ton of coal is mined on the canal, or reaches it, except over the L. V. and L. and S. RRs. It would be just as logical to include the Lehigh coal carried over the Morris and Essex, or North Penn. RR. The Pottsville statistician is apparently still living in the time when the Mauch Chunk coal was delivered from the mines at Summit Hill by the gravity road on to the canal, and before the L. and S. R.R. penetrated the Beaver Meadow Region.

In order to make up the total to about the amount returned by the mine inspectors, and to our report, it is necessary to add over 16 per cent. to these incomplete and incorrect returns, and this is done under the head of "Home Consumption, Estimated;" if in the "home consumption," is included coal used by the Philadelphia & Reading on its line to Philadelphia, in its shops at Reading and Philadelphia, and its steam colliers, the coal used at the furnaces and shops along the Lehigh, and other such items, he might indeed make up 3 000,000 tons; but no such amount as 16 per cent. of the coal returned by the railroads and canals is sold or used at the mines. With full reports no more than 6 or 7 per cent. need be left to "estimate," and even this estimate can be based on actual returns from a considerable portion of the mining regions.

We do not expect or claim to attain absolute accuracy in our returns, but there is no necessity for accepting returns of which 16 per cent. are a guess and the balance compiled in such a careless and unsatisfactory manner, as to be but little improvement on the simple and convenient method of getting a total by "estimating" a half and multiplying by two.

We have as yet said nothing about our neighbor's "estimate" of the production of bituminous coal. On the slim basis of returns of 4 566,495 tons, and guided by what in another place he calls "the lamentably defective" and "unreliable" census returns of 1870, this Pottsville statistician "estimates" or guesses that the total production of bituminous coal in 1874 was 19,907,699 tons! (there is nothing like guessing closely, even to the odd ton).

THE ENGINEERING AND MINING JOURNAL has direct official reports of about 17,000,000 tons of bituminous coal and local estimates of one-third more, so that the actual production of bituminous coal, in 1874, was about 24,000 000 tons of 2,000 lb; making our total coal production, anthracite, bituminous and lignites, about 48,000,000 tons of 2,000 lb; or say 43,000,000 tons of 2,240 lb. The Pottsville guess at the bituminous coal production is, therefore, only about 4,000,000 tons out. Almost all the bituminous coal is returned in net tons, while anthracite is reported in tons of 2,240 lb. We shall shortly publish the details of these returns.

Having thus gratified the request of the Pottsville *Miners' Journal* in pointing out a few of its errors, it has now an opportunity to apologize "like a gentleman" for the tone and language of its recent article.

NEW PUBLICATIONS.

FROISETH'S NEW SECTIONAL AND MINERAL MAP OF UTAH. Second Edition. Revised and re-engraved, 1875, by B. A. M FROISETH, Salt Lake City.

This excellent map is indispensable to every one having interests in the region represented. The map is a very elaborate one, giving the roads, railroads, limits of the mining districts, and the general topography, and has every appearance of being compiled with care and accuracy; it is, in a word, a valuable map, and one which has had, and will continue to have, a large sale.

FROISETH'S MAP OF LITTLE COTTONWOOD MINING DISTRICT AND VICINITY, UTAH, *on a scale of 400 feet to 1 inch.*

This detailed map shows the position of the several mining claims, mines, tunnels, &c. It forms a useful supplement to the more general map above noticed, and appears to be compiled with the same care.

WAGGENER'S STANDARD WAGES TABLES. *Showing Computations of Wages for any number of hours, from one to sixty, at rates from* $1 00 to $50.00 *per week.* D. B. WAGGENER & Co., Phila., 1875. PRICE $1.00.

A useful book for those who have to make up pay rolls, based on a weekly rate.

POPULAR SCIENCE MONTHLY for May; D. APPLETON & Co., New York.

This number contains an unusually attractive series of articles. We may note among these: "The first traces of Man in Europe." By Prof. ALBRECHT MUELLER; and a very interesting article on "Evolution and After Life."

SCRIBNER'S MONTHLY for May.

This number commences Vol. 10 of this valuable magazine. It contains an interesting article on the Drainage of Haarlem Lake in Holland, an engineering work of the greatest magnitude. We have several times spoken of the enormous machinery employed on this work, and the present non-technical description of the general subject of Dutch drainage will interest many of our readers.

A PRACTICAL TREATISE ON FRICTION OF AIR IN MINES, by the late J. J. ATKINSON. Price 50 cents. D. VAN NOSTRAND, New York.

A useful book that should be in the hands of every mine superintendent, mine boss and fireman in the country.

CONTINUOUS, REVOLVING DRAW-BRIDGES: *The Principles of their Construction, and the Calculations of the Strains in them.* By CLEMENS HERSCHEL. Boston: LITTLE, BROWN & COMPANY. 1875.—p. p. 54.

The analysis of strains in continuous bridges is a problem which has apparently greater attractions for writers on bridge construction than for bridge-builders, who are slow to believe in the economy of these structures. Mr. HERSCHEL, judging from his opening remarks, fully endorses the position assumed by prominent American engineers, that bridges with independent spans are generally the best. Avoiding, where not pertinent to his subject, a general discussion of continuous girders, he confines his investigation to revolving draw-bridges. Continuous fixed bridges are, at best, not a necessity, but draw-bridges are, and the practice which has prevailed in proportioning their parts having been, to a great extent, unfavorable to their safety and durability, from lack of a proper understanding of the governing principles, the present memoir seems to meet an existing want. After an introduction, historical and descriptive, relating to continuous girders, Mr. HERSCHEL proceeds to define essentially all the conditions of loading which are likely to obtain in the case of revolving draw-bridges, and to determine the reactions of the several points of support, for each case. The cases assumed are as follows:

I. The bridge open and loaded with snow.

II. The bridge shut and loaded with snow, plus the maximum live load.

These, which constitute all the cases of symmetrical loading are followed by six cases of unsymmetrical loading, as enumerated below, each case in reality consisting of two, "according as the snow load is considered or not:"

III. (a) ends free on firm central supports.
(b) " " " pivoted " "
IV. (a) " latched " firm " "
(a) " " " pivoted " "
V. (a) " lifted " firm " "
(b) " " " pivoted " "

Sub-cases (a) and (b), which define important distinctions, are explained as follows:—"(a) when the two central supports remain firm, the same as though they rested upon a solid, inelastic, stone pier, or as though the draw took bearing upon the circular girder, which, in turn, rests upon the 'live ring;' and (b), where the live ring is not considered as offering support, and the whole weight is thrown, by suitable framing, upon the pivot."

Mr. HERSCHEL'S investigations are made upon the assumption that each girder takes support at two points at equal distances each side of the center, and is thus divided into 3 continuous spans. The common practice of considering such an arrangement a case of but two spans, while not giving rise to any serious error, is a less refined method than the one above cited.

Part II. contains the mathematical demonstrations of the formulæ used in other parts of the work. This is an admirable arrangement. The memoir, to be complete, should contain this analysis—but most readers will be inclined, as Mr. HERSCHEL suggests, "to accept these formulæ in faith," and turn to the other portions of the treatise, in which the practical applications are given. There are many writers on engineering subjects, who would make their books more generally useful by adopting Mr. HERSCHEL'S plan of placing complicated analyses, such as those requiring the use of the calculus, by itself. In the work under consideration, in the actual computation of strains upon the girders, Mr. HERSCHEL uses and explains RITTER'S Method of Moments, which only requires a knowledge of the elementary principles of arithmetic and algebra. RITTER'S method is particularly adopted to link-drawbridge girders, in that it eliminates the error that results from methods requiring the points of inflection to be assumed as coincident with the panel points—and will be found simple and expeditious, when applied to bowstring bridges, roof trusses and other structures of irregular form. Mr. HERSCHEL'S description of the method will be of great value to those who, having such structures to design, do not find the original German work accessible to them.

The treatise under review is well illustrated by diagrams, contains the practical application of the principles established to the case of a drawbridge of 200 feet gross length, and is supplemented by a "list of books and articles in technical journals, relating to the subject of continuous girders (in part or in whole), in the German, French, and English languages, 1854-1874."

The memoir covers the ground so thoroughly, that it is well suited for use as a text-book, while it will be indispensable to the civil engineer. We can also commend it to writers on technical subjects, as affording an excellent example of general arrangement and treatment of a problem.

The memoir, as stated in the preface, is a reprint from a paper presented to the American Society of Civil Engineers, of which Mr. HERSCHEL is a member. We may add that the paper was offered in competition for the Norman Medal of the Society, and that there was only one other competitor. The medal was awarded to the other paper, which was a most admirable account of the construction of a masonry dam. While it is very important that the principles of dam construction should be clearly understood, the literature of the subject is quite extensive, and on the other hand, a memoir on draw-bridges, such as we have been considering, seems to throw light on principles and methods which will probably be new to most engineers. We hope that the Board of Censors did not mean by this, the first award of the Norman Medal, to intimate to future competitors that papers on subjects requiring the use of the higher analysis for their investigation were not desired.

Kazetl's Direct Process for the Manufacture of Wrought Iron.*

SIEMENS is making, as you are aware, little or no progress with the direct process. I myself was for some time in error regarding his method, supposing that the iron was reduced from the molten ore by solid carbon. But, as I now know, SIEMENS, like all his predecessors in the direct process, reduces the iron before the ore melts, by means of the added coal. It seems to me now, indeed, necessary that in case of the reduction by solid coal, this process must take place before the liquefaction of the iron, because the required gasification of the carbon absorbs so much heat, that it is apparently impossible to maintain the iron in a liquid condition.

Very different, however, must be the result, when the reduction of the molten ores, and particularly of the bath of molten ores in a Siemens furnace, at the highest practicable temperature, is effected by carbonic oxide, or other reducing gases, involving thus no gasification of the carbon at the time. I think, therefore, that this latest method of the direct production of iron, for which a patent has been obtained in Austria, has the best prospect of thorough success; and on this account, I have desired to communicate it to you.

Concerning the practical manipulation of this process, which was invented by director KAZETL, of Neuberg, the following may be added:

The iron ore is melted down on the basin-shaped hearth of a Siemens furnace. The ore, in portions of 5 to 10 hundredweights, is piled on each side of the working-door, whence it melts down into the basin of the furnace, and is there further heated to the highest possible degree.

* Extract from a letter of Director PETER VON TUNNER, of Leoben, presented by Prof. THOS EGLESTON, at the New Haven meeting of the Institute of Mining Engineers, February, 1875. (Translated.)

The reducing gas is introduced at the working-door, under pressure, through a hollow rabble (resembling that used in steam-puddling, and shown in the annexed sketch, Fig. 2), which is moved about through the whole bath. According to experience, the iron is precipitated in a few minutes and sinks to the bottom.

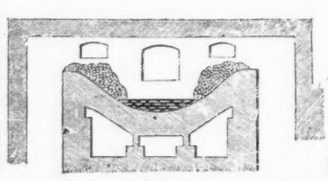

Fig. 1.

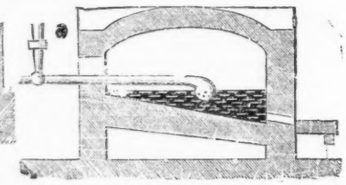

Fig. 2.

The supernatant slag, containing little iron, is drawn off with a rabble, and the sides of the hearth are again supplied with ore; and so on, until in a few hours, according to the size of the furnace, 50 or more hundredweights of iron have been collected in the basin. In order to prevent, at the beginning of the process, when the iron lies yet deep in the basin, the possible formation of an iron-chill (*Eisenplaster*), it might be advisable to melt beforehand 5 to 10 hundredweights of pig.

At the close of the operation, as in the Bessemer process, a recarburization can be effected by adding and melting a suitable quantity of spiegeleisen. The final product is cast in pans or moulds.

DISCUSSION.

Mr. HOLLEY said that he could hardly agree with Director VON TUNNER'S intimation of the lack of success attaching to Mr. SIEMENS' direct process. He had seen that process in practical operation recently near Glasgow, and, without entering into details, he felt bound to say that so far as the production of wrought iron by a single and wholly mechanical operation was concerned, it certainly did accomplish that object in a very striking manner. It was impossible as yet to determine its economical results. The Steel Company of Scotland did not yet know themselves the cost of the "paddle balls," or rather the partly-fused sponge-balls produced, because, as but one rotator was working, both fuel and labor were excessive. The iron bloom hammered from the ball appeared to contain some particles of coal-dust and clay. Probably the process would be most useful for producing a very cheap wrought iron from impure ores. Sulphur and phosphorus appeared to be removed to a large extent in the operation. That the sponge produced would be the best material for open-hearth or MARTIN steel was not likely, as it was expected to cost somewhat more than pig-iron, while BLAIR'S cold sponge was understood to cost less; pig and raw ore would also cost less. But if SIEMENS' sponge could be made at a little greater cost than that of pig—and as to this there seemed little doubt among the experts who were working the process—it would make a very low priced wrought iron, fit, at least, for the more ordinary uses. The difficulty about refractory linings, which at first seemed so serious, appeared to have been overcome. He had seen a furnace which had been running continuously for nearly a month. The bauxite lining of the slopes had not apparently been cut at all, and the oxide lining (hammer scale) of the cylindrical parts was readily renewed or patched between heats.

Blast Furnace Economy.

REDUCTION OF CO_2 IN ANTHRACITE FURNACES.*

By HENRY M. HOWE, A.M., E. M.

MY attention has been drawn, within a few days, to a series of articles in volume XVIII. of the ENGINEERING AND MINING JOURNAL, 1874, by Mr. J. A. CHURCH, in which it is stated (among other things) that the details of the practice at certain anthracite furnaces in Pennsylvania indicate that their excessive consumption of fuel is mainly due to the excessive and needless reduction of CO_2 in the upper part of the furnace by the reaction

$$(1.)\quad CO_2 + C = 2\,CO;$$

moreover, that this may be prevented by using lower stacks and narrower throats, so that the exit gases shall be hotter, the upper part of the furnace be hotter and the entering charge be more rapidly heated.

While I fully appreciate the great good that Mr. CHURCH has done by calling the attention of ironmasters to such subjects, and the importance of familiarizing them with the methods used by modern investigators in considering blast-furnace phenomena, I think he has here advised so unwise a step that I feel justified in asking your attention to the reasons why I differ from him.†

I propose, 1st, to criticize the reasoning from which he concludes that the waste of fuel is mainly due to the reduction of CO^2, and, 2d, to attempt to show that the remedy proposed would probably increase the waste of fuel.

I. I need hardly tell you that it is of the greatest importance to have as much as possible of the carbon of the charge to escape from the furnace as CO_2, and as little as possible as CO. When a ton of C is oxidized to CO, only 2473 calories are developed; but if it is oxidized to CO_2, 8080 calories are developed, or over three times as much heat. And if the CO_2 so formed is again reduced to CO, by reaction (1), 8080 − 2473 = 5607 calories are absorbed, and our heat development is no greater than if the C had never been oxidized beyond CO.

* A paper read before the American Institute of Mining Engineers, at New Haven, Conn., on Wednesday, February 24, 1875.

† It is only fair to say that I had not heard of Professor B. FRAZIER'S paper on the subject when this paper was read.—H. M. H.

The duties of the fuel are two-fold: 1st, to reduce and carburize the iron of the charge; 2d, to produce heat. Reduction and heating it accomplishes by combustion, 1st, with the O of the ore, 2d, with that of the blast. The more thoroughly oxidized the products of its combustion leave the furnace, the greater the duty it has performed; the cooler they escape, the more thoroughly have they given up to the descending charge the heat produced. So, when an excessive quantity of fuel is used it is in general safe to say (provided we cannot decrease the amount of slag to be melted or carbonate of lime to be calcined) that the excess is due mainly, either to the carbon of the charge not being oxidized as far as possible, *i. e.* to the CO_2 of the gases falling below the attainable maximum, or to the gases leaving the furnace hotter than is necessary.

Considering the former source, let us find (A), the maximum weight of CO_2 we can hope to find in the escaping gases, and, (B), the weight actually contained in them. The difference between these will be the weight of CO_2 needlessly reduced in the furnace in question.

A.

We might expect the generation of CO_2 from several sources; I. The carburizing of the oxygen of the blast; II. The decomposition of the carbonate of lime charged; III. The reduction of $Si O_2$, $P_2 O_5$, Ca O, etc.; IV. The reduction of iron oxide; V. The impregnation of carbon by the reaction

(2.) $2CO = CO_2 + C.$

I. The CO_2 formed by the blast acting directly on the fuel at the tuyeres is entirely, or nearly entirely, reduced at once by the surrounding incandescent fuel, and may be entirely neglected in considering hot-blast anthracite furnaces.

II. The CO_2 generated by the decomposition of carbonate of lime is almost inevitably reduced, according to BELL,* by reaction (1.). Quicklime rapidly absorbs CO_2 in a warm atmosphere containing much CO_2; Ca CO_3 cannot be decomposed, at any rate permanently, in such an atmosphere. It is said to retain its CO_2, when under pressure, even at the temperature of fusion. So, even if any Ca CO_3 were decomposed so near the tunnel head that the surrounding and overlying fuel, through which the CO_2 evolved must pass, would be too cold to decompose it, nevertheless the descending quicklime would meet so much CO_2 from reduction of iron oxide and carbon deposition that Ca CO_3 would be rapidly formed again; and thus as much CO_2 as is gained from the decomposition of Ca CO_3 must be subtracted from that which we might expect from reduction of iron oxide. It is only at a depth at which the temperature is so high that any CO_2 given off is reduced by reaction (1.), that Ca CO_3 can be permanently reduced. It seems very improbable that there ever is an appreciable portion of the furnace entirely below the zone of reduction, and therefore free from CO_2 caused by reduction of iron oxide, and yet not hot enough to reduce CO_2 evolved from Ca CO_3, either by the action of carbon, metallic iron, or low iron oxide.

III. Nor can we hope to preserve the CO_2 formed by the reduction of $Si O_2$, $P_2 O_5$, etc., etc., as these are reduced only at so high a temperature that the resulting CO_2 is at once decomposed by the surrounding fuel.

IV. While several different reactions actually occur in reducing iron oxide, the effect is the same, (when we deal with iron *oxides*) as if the entire reduction were performed by the reactions

(3.) $Fe_2 O_3 + 3\,CO = 3\,CO_2 + 2\,Fe,$
and (4.) $Fe\,O + CO = CO_2 + Fe,$

as far as the formation of CO_2 is concerned, *i. e.*, for every atom of oxygen in the iron oxide charged, a molecule of CO_2 is formed, or for every ton of this oxygen 2 75 tons of CO_2 are given to the gases.

V. Although an immense amount of CO_2 may be formed, and an immense weight of carbon deposited, by reaction (2.), $2\,CO = CO_2 + C$, yet the only CO_2 we can hope to find in the exit gases from this source, [besides that already accounted for by reactions (3) and (4)] is that generated by, and corresponding with, the deposition of the carbon permanently retained in the pig metal. Thus for every atom of carbon in the molten metal we can hope for a molecule of CO^2 in the exit gases, or 3 67 tons of CO_2 for every ton of carbon in the pig.

By as much as the CO_2 actually in the gases falls short of the weight indicated in IV. and V., as generated by the reactions (2), (3) and (4), by so much, and by so much only, do we fall short of practically attainable perfection in this respect, according to BELL.†

Let us apply this reasoning to MR. CHURCH'S data; and let us consider his example of 1869-1873, in which we have 0·405 tons of oxygen in the iron oxide of the ore, after deducting the unreduced oxide slagged off, and 0·03 tons of carbon in the pig metal, per ton of iron produced.

	Tons CO_2
From reduction of iron oxide, $0{\cdot}405 \times 2{\cdot}75 =$	1·114
From carbon deposition, $0{\cdot}03 \times 3{\cdot}67 =$	0·110
Greatest attainable weight of CO_2 per ton of iron, according to BELL.	1·224 tons.

B.

The actual weight of CO_2 in the gases is easily found if we know the weights of carbon and of oxygen they contain, for, unless the fuel contains hydrocarbons, we can safely assume all its carbon to escape either as CO or as CO_2. [For this purpose we must, of course, deduct from the total weight of O that which escapes combined with H as $H_2 O$.] MR. CHURCH'S data give the weight of carbon, which is, of course, all that contained in the flux and fuel, minus that absorbed by the pig. The weight of oxygen, however, is not given; it is all that in the oxides to be reduced, the CO_2 of the flux, and the blast. That contained in the first two is given in the composition of the charge, and our problem resolves itself into finding the weight of the blast. This cannot be found with sufficient accuracy by direct measurement. As we shall see further on, to find with satisfaction by this means the loss of the heat due to the reduction of CO_2, we must know the weight of the blast within two or three per cent. at most. Owing to the varying and undeterminable loss by leakage, and to other sources of uncertainty, such accuracy is unattainable with ordinary construction.

Of course a direct analysis of the escaping gases would tell us the weight of CO_2 they contain exactly, (the weight of C they contain per ton of iron being known). Moreover, it would give us the weights of O and of N they contain per ton of iron. From the first we can tell the weight of O in the blast by deducting from the total O that set free by the reduction of the ore and the calcination of the flux. We can then compare the corresponding weight of blast with that weight which the relative amounts of C and of N would indicate, and thus check our work. A second check is afforded by comparing with the heat required for operations of the furnace, the sum of the sensible heat introduced by the blast, plus the heat developed by the combustion between the carbon of the charge and the oxygen found in the gases. The heat required must, of course, equal the heat developed. Some such methods of checking our work are of especial importance in applying, as we are here obliged to, deductions based upon observations of European smelting to anthracite smelting in Pennsylvania, the attendant circumstances being different.

In default of a direct analysis, I suppose MR. CHURCH'S mode of finding the weight of blast is as good as any. It could not possibly give very reliable results, as it affords no means of checking them, but under the conditions of the problem, as I understand them, its results are peculiarly unreliable and vague.

He finds approximately the quantity of heat, H, needed for the operations of the furnace; then, (knowing the weight of carbon actually used, and the temperature of the blast), he finds a weight of blast which will bring into the furnace a certain amount of sensible heat, $H^{\prime}$, and at the same time as much oxygen as will, together with that furnished by the reduction of the ore, (by combustion with the carbon of the charge), produce an amount of heat $H^{\prime\prime}$, such that:
(5); H, heat required $= H^{\prime}$, sensible heat of blast $+ H^{\prime\prime}$, heat from combustion.

This is a perfectly true equation, of course. Knowing, then, the weight of blast, and thence the O in the Blast), the weight of O in the ore and flux, and of C in the flux and fuel having been given in the composition of the charge; in short, knowing the weight of O and of C in the gases, it is easy to calculate how much CO_2 they contain.

His whole method is based upon the calculation of the heat requirement of the furnace, which, with the meagre data given, is liable to very great errors; errors so great as to make any deductions based upon it as to the amount of CO_2 present in the gases, exceedingly unreliable. An increase of any one of the members of the heat requirement, H, equation (5), will require more heat to be generated in the furnace. As the temperature of the blast is fixed, this requirement can only be met by supposing more blast to have been introduced, which would not only bring in more sensible heat but also more oxygen, so that we would have more CO_2 in the exit gases, and hence less loss of heat from reduction of CO_2.

If it were possible to calculate closely the heat required in the process, this method would give valuable results. But, unless he has data which I suppose to be wanting, it is impossible to arrive with satisfactory closeness at the heat requirement; failing this, the amount of CO_2 present cannot be told accurately enough even to draw the rough inference which MR. CHURCH draws.

Two very important elements of the heat-requirement calculation, I think, are wanting—the temperature and the weight of the escaping gases. The second is a function of the weight of blast injected, our unknown quantity. Looking at it algebraically,

let x = weight of oxygen in blast,
L = " " " from all other sources, available for combustion,
y = temperature of escaping gases,
and H = heat requirement from all other sources than the sensible heat in the gases;
then, heat developed = heated required.

$f(x + L) = H + (y\,f\,x$ = sensible heat in gases.)

Here we have only one equation, with two unknown quantities. If either of our variables could only vary within narrow limits, we might arrive at a result very near the truth. Unfortunately, the variation between probable limits is so considerable as to make it utterly impossible to determine what proportion of the loss of heat is caused by the three principal causes we are considering, viz.: unnecessary reduction of CO_2, heat in the gases, and weight of slag and Ca CO_3. To illustrate how different values assigned to the temperature of the escaping gases will indicate different weights of blast, and thus different divisions of the waste of heat between the three sources, let us consider MR. CHURCH'S example of 1869-1873, assuming, I., the temperature chosen by MR. CHURCH, 260° C; and, II., a temperature of 486° C, or 226° degrees higher than the first, and calculate what proportion of the loss of heat is due to each source, under the two assumptions. I have adopted, for convenience of comparison, MR. CHURCH'S constants and method of calculation, but I have considered the CO_2 of the Ca CO_3 to be decomposed into CO + O. This does not affect the calculation, as it adds the same number of calories to either side of the account.

* Journal of the Iron and Steel Institute, Vol. 1, 1871, p. 195.
† Journal of the Iron and Steel Institute, Vol. 1, 1871, p. 195.

DATA.

Charge per ton of pig.		Pig.	Slag	Gas.
	Tons.			
Fe_2O_3 ..... 1.283	Fe	0.940		
	O			0.405
Fe O 0.140	Fe O		0.078	
	Si	00.30		
$Si O_2$ 0.530	O			0.030
	$Si O_2$		0.470	
Ca O, Mg O, Al_2O_3, ash, etc. . 1.171	..		1.171	
CO_2 in Ca CO_3 ..... 0.600	..			0.600
C in fuel 1.685	..	0.030		1.655
H_2O and volatile 0.357	..			0.357
5.766		1.000	1.719	3.047

Specific heat of blast, 0.239 assumed.
" " " gases, 0.239 "
Moisture in blast, .62 per cent.
Temperature of blast 482° C.
Unit of heat, 1 ton of water raised 1 degree Centigrade.

CASE I.—CASES ASSUMED AT 260° C.

Heat Requirement.	*Ton Calories.*
Reduction of Fe_2O_3 1615×0.233	376
Reduction of Fe_2O_3, 1857×0.767	1,447
Reduction of $Si O_2$, etc., .03×7000	210
Decomposition of limestone, 373.5×1.364	509
Fusion of pig, 1×337	337
Fusion of Slag, 1.719×550	942
Decomposition of water, 8×3222×0.0062	160
Evaporation of water, 606.5×0.357	216
Radiation	400
Reduction of CO_2 of Ca CO_3 to CO+O, 5608×0.164	920
Sensible heat in gases, 11.047×260×0.239	683
Total heat requirement	6,200

Heat Development.

O in ore and 8 tons of blast	2.308
Free O from CO_2 of Ca CO_3 reduced to CO+O	0.218
Total O for combustion	2.526
Total C " "	1.655
1.655 ton C unites with 2.207 tons O to CO, and develops 1.655×2,473	4,093
2.526 − 2.207 = 319 ton O further oxidizes 0.240 ton C from CO to CO_2, and develops 0.240×5,607	1,345
8 tons blast, at 482°, 482×8×0.239	922
Total heat development	6,360
Total heat requirement	6,200
Error	160

CO_2 developed = $0.240 \times \frac{44}{12} = 0.880$ ton.

Now I have already pointed out in A that the greatest amount of CO_2 to be hoped for in the exit gases is 1.224 tons, so that we now have a deficit of 1.224 − 0.880 = 0.344 ton CO_2, and therefore lose by reduction of CO_2 $0.344 \times \frac{12}{44} \times 5,607 = 527$ calories.

If we assume that the lowest possible weight of gases is 3.34 tons (see Journal Iron and Steel Inst., Vol. I., 1872, p. 80) and assume 208° C as their lowest possible temperature, 3.34×208×0.239 = 166 calories represents the lowest possible amount of heat they can carry off. 683 − 166 = 517 calories, then, is the unnecessary heat in the waste gases by case I. [The gases do escape at even lower temperatures than 208; GRUNER gives them at 100° C at the No. 1 furnace, Montlugon, St. Jacques, with hydrated ores.]

If we assume 0.6 tons as the minimum weight of slag, (though I believe less is sometimes made), the minimum heat requirement for fusion of slag will be 0.6×550 = 330 calories. Since in some furnaces no limestone, and in many furnaces calcined limestone, is used, the minimum heat requirement for decomposing limestone we may call 0. Then we have unnecessary heat absorption, in case I., for decomposing Ca CO_3 and fusing slag = 509 + 942 − 330 = 1121 calories.

According, then, to case I., the waste of heat is distributed thus:—

Unnecessary reduction of CO_2 causes a waste of ..... 527 calories
" heat in exit gases " " " " ..... 517 "
" calcination and fusion of Ca CO_3 and slag 1121 "

CASE II.—GASES AT 486° C.

If now we assume that our gases escape at 486° C, or 226° higher, as is very possible, we have at once an increase of heat requirement thus:

CASE II. HEAT REQUIREMENT.	calories.
Additional blast introduced, 0.456 tons.	
0.456 tons more gases at 260° 260×0.456×0.239	28
Decomposition of H_2O in additional blast, 0.456×0.0062×3222	9
11.503 tons gases 226° higher, 226×11.503×0.239	621
Increase of heat requirement by case B	658
Heat requirement by case A	6,200
Total heat requirement by case B	6,858

CASE II. HEAT DEVELOPMENT. calories.

Heat introduced by 0.456 tons additional blast at 482° 482×0.456×0.239	53
0.105 ton O in additional blast burns 0.079 C from CO to CO_2, 0.079×5607	443
Increase of heat development by case B	496
Heat development by case A	6,360
Total heat development by case B	6,856
" " requirement " " B	6,858
Error, 2 calories	2

We had in case I., 0.880 tons CO_2 in the escaping gases. In case II., 0.105 tons additional O yields 0.289 tons additional CO_2, giving us in all 0.880 + 0.289 = 1.169 tons CO_2. By the conditions of the problem we found the greatest attainable weight of CO_2 to be 1.224 tons. In case II., then, we fall short of the maximum by only 0.055 tons CO_2, containing 0.015 tons C. Our loss of heat from reduction of CO_2 will then be 0.015×5,607 = 84 calories.

Heat in gases by case I	683 calories.
Increase by case II, 621 + 28	649 "
Total heat in gases by case II	1,332 "
Minimum heat in gases	166 "
Unnecessary heat in gases by case II	1,166 "

According to case II., then, the waste of heat will be distributed among these three sources thus:—

Unnecessary reduction of CO_2 ..... 84 calories.
" heat in exit gases ..... 1,166 "
" calcination and fusion of Ca CO_3 and slag 1,121 "

I mean by the word "unnecessary" reduction, etc., "in excess of the minimum which is attainable under any circumstances whatever," and not necessarily "conveniently or economically avoidable."

Case III. If we assume the gases to escape at a temperature still lower than 260° C, (the temperature Mr. CHURCH assumes, case I.) we will find that more of the waste of heat is caused by reduction of CO_2 than by the heat in the waste gases, but that still more is due to the excessive weight of slag and Ca CO_3 than to either of the other sources. But it is highly improbable that the gases should escape much below 260° C and yet that so much CO_2 should be reduced as this supposition would imply. In most cases of excessive waste of fuel from reduction of CO_2 and heat in the gases, it is due alike to both sources. As we diminish the waste from one source, we, in so doing, diminish that from the other. If our gases contain too little CO_2, we will generally find them escaping unnecessarily hot.

Case IV. It may be objected that GRUNER'S theory that the CO_2 of the limestone *may* escape unreduced, would make the maximum CO_2 much greater; that consequently, the conditions of the problem would indicate that much more avoidable reduction of CO_2 had taken place; that thus the loss of heat would be much greater than it has been found to be in cases I. and II. from this source.

I answer, 1st, that this does not affect my argument, provided that we admit that BELL'S theory is as probable, or nearly as probable, as GRUNER'S. I am not trying to show that it is impossible, or even improbable, that most of the waste of fuel is due to the reduction of CO_2, but that our data are not sufficient to enable us to decide to which source it is due; that conclusions drawn from them on this point are not trustworthy. All must admit that in the present state of our knowledge, BELL'S theory carries sufficient weight to make conclusions, which are directly opposed to it, unreliable.

2d. The weight of CO_2 in the gases, which BELL'S theory indicates to be possible, has never been reached in practice, and all the recorded experience we have on the subject seems to indicate that it is extremely impossible that it will ever be passed.

3d I do not understand GRUNER to say or to think that so great a quantity of CO_2 from Ca CO_3, as 0.6 tons per ton of iron, can be enabled to escape unreduced. In the seven examples he discusses in his "Studies," the highest weight of CO_2 thus considered is 0.4 tons.

4th. If we were warranted in expecting all the Co_2 from Ca CO_3 in the waste gases, Mr. CHURCH'S conclusion would not be certain. The greatest possible weight of CO_2 would then be:

Case IV., GRUNER'S theory: gases at 480°C	tons CO_2
From reduction of oxids, vide A	1.114
" decomposition of limestone	0.600
" impregnation (GRUNER)	0.000
Maximum CO_2	1.714
According to case II., the gases actually have	1.169
CO_2 reduced	0.545
C corresponding	0.148

Loss of heat from reduction of CO_2 0.148×5,607 = 830 calories.
" " " waste gases, as per case II. = 1.166 "
" " " calcination and fusion of slag and Ca CO_3 = 1121 "

Thus, even according to this extreme assumption, it may be shown that the loss of heat is due less to the reduction of CO_2 than to either of the other sources.

Case V. If we assume that the gases escape at a temperature of 260° C, we will find the loss of heat greater from reduction of CO_2 than from the heat in the gases, according to GRUNER.

Maximum CO_2, as per case IV.....1,714 tons
Actual CO_2, as per case I..... .880 "

CO_2 reduced..... .834 "
C corresponding, $.834 \times \frac{12}{44}$.....=0.227 "

Loss of heat from unnecessary reduction of CO_2, $0.227 \times 5,607$ =1,273 calories.
From unnecessary heat in the gases, as per case I..... 517 "
" " calcination of $Ca CO_3$ and fusion of slag.... 1,121 "

Of course, if Mr. CHURCH actually knows by accurate observations, that the temperature of the gases was 260° C, cases II., III. and IV. become at once impossible. In such case, the waste of heat due to unnecessary reduction of CO^2 will be about equal to that caused by unnecessary heat in the gases, or greater than it, according as we assume (I), BELL's or (V), GRUNER's extreme hypothesis. But under either hypothesis it will not materially exceed the waste caused by the unnecessary weight of slag; and $Ca CO_3$.

TO BE CONTINUED.

Notes.

Work Resumed.—The miners at the Reserve Colliery, C. B., recently struck for higher wages but have resumed work.

Coal Mined in Russia in 1874.—Total Bituminous and Anthracite 83 575,000 puds equal to 1,508 529 tons of 2,000 lb.

Selwyn, the Canadian Geologist, has discovered a vein of coal 18 to 20 feet thick on the Saskatchewan River, some 1,200 miles by the river above Fort Garry, in Manitoba.

Problem for the "Bulletin" Office.—If Bessemer steel rails at the works in France are selling at $73, American currency, (see the *Bulletin*, April 9th) and American Bessemer rails at our works at $72.50, import duty being $28, and freights from France to New York say, $6, how much increase in the duty will be necessary to keep the French rails out, and "give us the control of our own market?"

Thermal Conductivity of Rocks.—Some observations made many years since by Mr. W. J. HENWOOD, on the temperature of the granites and slates of Cornwall, have induced Prof. A. S. HERSCHEL and Mr. G. A. LABOUR, of the Geological Survey, to make a series of similar observations on the thermal conductivity of certain rocks in the northern counties. Granite has been found to offer the least resistance to the passage of heat and coal the greatest. Shale comes next below coal and between these and basalt there is a wide difference.

Large runs at the Isabella Furnace, Pittsburgh, Pa.—We give below the record of the Isabella furnace for the six months between October, 1874, and April 1, 1875—one day lost:

Make for six months..... .....16,660 1220-2240 tons.
Average per week..... 640 1769-2240 "
Average per day (181 days)..... 92 105-2240 "

The tons are of 2,240 lb. About three-eighths of all iron made was foundry. With the exception of about 150 tons the remaining five-eighths were No. 1 mill. It must be borne in mind that this is only an eighteen foot furnace, seventy-five feet high.—*American Manufacturer.*

Puddling Iron.—According to the invention of Mr. W. EVANS, of Moxley, near Wednesbury, a puddling chamber, a refining chamber, and a melting chamber, are arranged in juxtaposition, or side by side, the said chambers being at different levels, the puddling chamber being the lowest. The puddling chamber is situated near the fireplace of the furnace; next to said puddling furnace is the refining chamber, and between the said refining chamber and the exit flue of the furnace is the melting chamber. The pig iron to be made into wrought iron is placed on the inclined bed of the melting chamber, where it is melted by the waste heat passing through the chamber, and runs into the refining chamber, where it is refined by the action of blasts of air upon it. The refined iron passes by a passage to the puddling chamber, where it is puddled in the usual way.

STATISTICS OF COAL PRODUCTION.

Anthracite.

Anthracite free. *Bituminous*, per ton of 28 bushels, 80 lb. to the bushel, 75c., gold.
All *slack*, or *culm*, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel, 40c., gold.
Not otherwise provided for, per ton, 40c. gold.

This is the only report published that give a full and accurate returns of the production of our Anthracite mines.
Comparative Statement for the week ending April 17:

	1875.		1874.	
	Week.	Year.*	Week.	Year.
Wyoming Region.				
D. and H. Canal Co	58 518	757.547	58,158	663,638
D. L. and W. RR. Co	64,561	757,040	56,053	663 649
Penn. Coal Co	21,824	302.917	28,310	315,292
L. V. RR. Co	13,852	205,520	25,187	291,484
P. and N. Y. RR. Co	3,693	14 122	3,407	19.209
C. R. of N. J	7,934	65,088	33,884	310,990
Penn. Canal	..	..	..	..
Lack. and B. RR	..	41,426	..	50 018
	170,382	2,210,668	204,999	2,320,260
Lehigh Region.				
L. V. RR. Co	5,207	115,414	65,089	811,182
C. RR. of N. J	..	5,499	27,975	223.751
D. H. and W. B. RR	990	9.433	864	5,001
	6,197	130,346	93,928	1,039,938
Schuylkill Region				
P. and R. R. RR. Co	22,158	271,952	129.457	1,098,271
Shamokin and Lykens Val.	19,042	236,422	18,477	150,976
	41,200	508,374	147.934	1,249,247
Sullivan Region.				
Sul. and Erie RR. Co	454	4 493	541	6,702
Total	218,233	2,853,881	447,402	4,616,147
Increase	..	..	..	..
Decrease	229,169	1 762.266	..	..

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production

The following table does not give the entire production of our bituminous mines, but it is by far the fullest report published.

The Production of Bituminous Coal for the week ending April 17, was as follows:

TONS of 2000 lb., except where otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2240 lb	47,255	386,134
Barclay Region, Pa.		
Barclay R.R. tons of 2240 lb	3 436	81,574
Broad Top Region, Pa.		
Huntingdon & Broad Top R.R.	3,331	55,187
East Broad Top	1,145	9.338
Clearfield, Region, Pa		
Snow Shoe	1,869	23 192
Tyrone and Clearfield	21,271	243.733
Allegheny Region, Pa.		
Pennsylvania R.R.	5,754	54.793
Pittsburgh Region, Pa.		
West Penn. R.R	4,889	55,811
Southwest Penn. R.R.	40	1,608
Penn and Westmoreland gas coal, Pa. RR.	1,452	149.342
Pennsylvania R.R.	6 947	77,645
Kanawha Region, W. Va.		
Chesapeake and Ohio R.R.	3,105	38,287

The Production of Coke for the week ending April 3.
Tons of 2000 lb.

	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	261
Alleghany Region	..	53
West Penn. R.R.	65	14,342
Southwest Penn. R.R.	11 038	140,413
Gas Coal, Penn. R.R	220	8,226
Pittsburgh Coal, Penn. R.R	2,148	24,084

Production of Bituminous Coal, 1875.

Tons of 2000 lb.	Previous.	Feb.	Total.
Blossburgh Region	19,039	24,763	43,802
Barclay Region	28 605	26,702	55,307
McIntyre Coal Co	5,911	3,950	9 801
Broad-Top Region	11,107	12,204	23,211
Cumberland Region	87,579	77,184	164,763
East Broad Top	1,790	2,091	3,881
Snow Shoe	6,277	5 624	11,901
Clearfield Region	47,453	59,323	106,776
Alleghany Region	14 887	14,858	29 747
Pittsburgh Region.			
West Penn. RR	16,055	13.758	29,813
Southwest Penn. RR	413	524	937
Gas Coal, Penn. RR	61,893	64,367	126,260
Pittsburgh Coal, Penn. RR	22,172	16,503	38,675
Saw Mill Run RR	287	..	..
Cleveland and Pittsburgh RR.	20 882	25,900	46,782
Pittsburgh, Cincinnati and St. Louis RR	50,598	64,820	115.418
Erie and Pittsburgh RR	11,996	15,874	17,870
Pittsburgh, Fort Wayne and Chicago RR	13,718	16,524	30 242
Castle Shannon RR	7,998	8 734	16,732
A. V. & P. R.R.	242	233	475
Pittsburgh and Connellsville R.	25.850	24 404	50,254
Monongahela Nav. Co	..	..	..
Keeling & Co	8,741	8,750	17,491
Wettengell & Gormley	1 961	..	..
J. W. Carlin & Co	..	..	..
Pittsburgh Va. & C. R.R.	2,346	4,098	6.444
Allegheny Valley R.R.	48,249	44,432	92,681
St. Louis Region.			
St. L. A. & T. H. R. R. and Branches	31,060	30,883	61,943
Illinois and St. Louis	..	..	..
Indiana North and South RR.	264	..	..
Evansville & Crawfordsville RR	2,265	2,886	5 151
Ohio & Mississippi RR	20,042	19,654	39.696
Kanawha Region.			
Penn. Coal & R.R. Co	8,745	9,494	18,239
Kanawha Region.			
Chesapeake and Ohio RR	7.947	6,035	13,982
Warrior Region, Ala.			
South and North Alabama RR.	3.424	3,504	6 928
Cahaba Region, Ala.			
South and North Alabama RR.	1,350	1,400	2.790
S. R. & D. R.R.	1,257	1,067	2,324
Chicago B. & Q. R.R	37,634	39,661	77,295
B. & M. R.; R.R.	7.371	7,503	14,874
Union Pacific R. R.	12,572	23,025	35.597
Summit County R.R.	..	..	..
Keokuk & Des Moines R. R.	..	..	..
Denver & Rio Grande	3.104	2,939	6,043
Cairo & St. Louis	3,106	..	..
	656,132		

Receipts at Port Richmond, 600; shipments, 400 tons; and balance on hand 2,200 tons.

The receipts at Buffalo, via. L. S. & M. S. R.R. for the week were 4,928 tons.

The exports of coal from Baltimore for the week were 1,434 tons, and for the year, 13,343, as compared with 30,850 tons to the corresponding time in 1874.

The decrease of shipments of Cumberland coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads, amounts to 70,560 tons.

Receipts at Greenwich, Philadelphia:

	Bituminous.	Gas Coals.
Receipts	337	....
Shipments	303	....
On hand	34	....

	week.	year 1875.	year 1874.
The receipts of coal at Coal Port (Trenton)	..	206	37,548
" " " South Amboy	196	17,196	215 950
Shipments at Coal Port (Trenton)	7,089	196	33,421
" South Amboy	..	94-395	158,959

COAL TRADE REVIEW.

NEW YORK, April 23, 1875

Anthracite.

The supply is far behind the demand. The contractors of the companies mining are charging their friends from 25 cents to 50 cents a ton above circular rates, and are only supplying such trade as they desire to acquire or retain. From third hands, coal is generally being sold at a considerable advance, according to the requirements of the buyer. Our Chicago correspondents note the award of a contract for 17,000 tons of grate, for the Water Works of that city.

Price Circulars for May.—The Delaware, Lackawanna and Western, and the Delaware and Hudson Canal Company have named the following prices for May: Lump, $4 80; steamer, $4 90; grate, $5 00; egg, $5 15; store, $5 60; chesnut, $4 60. This is an advance of 20 cents a ton, all around, over April prices, and an *advance* of 10 cents per ton over those of May, 1874. The Pennsylvania Coal Company quote for May: Lump, $4 70; steamer, $4 70; grate, $4 80; egg, $4 90; stove, $5 40; chestnut, 4 45, or an advance of 10 cents all around. The circulars are all dated the 20th inst The New York Lehigh Coal Exchange in their circular say:

"*Resolved*, That inasmuch as the suspension of work still continue at the mines in the Lehigh Region, it is considered inexpedient to make prices for Lehigh Coal for the month of May."

The Delaware and Hudson Canal Company say:

"Owing to the backwardness of the season, and the late opening of our canal, we cannot accept orders after this date, for delivery in the month of April.

"The above will be the prices for coal deliverable free on board vessel at Rondout or Weehawken, between the 1st of May and the 1st of June next, on your monthly allotment as well as upon orders accepted, but unfilled April 30."

The Strike.—There have been no further resumptions, but the feeling still exists that work will be generally resumed very soon, in spite of the vote in the Schuylkill Region to stand for an advance from last year's wages. There have been a few outrages, but as a rule all is quiet.

Bituminous.

It is reported that the Boston and Providence, and Old Colony and Newport Railroads, have closed contracts for a year's supply of Cumberland coal, at surprisingly low rates. The aggregate quantity is stated to be from 20,000 to 40,000 tons.

Some of the Ocean Steamship Lines have made contracts for Cumberland coal at $6 25@6 35 per ton, delivered as may be required during the year, alongside in this port. These rates which, in some instances, are nearly $1 00 per ton less than those of last year are so favorable that they must attract the attention of the officers of the other steamship companies, and will probably lead to smaller importations of foreign, and heavier purchases of our Cumberland coals on this account. Moreover, these figures will show the European officers of some of these companies, that the prices here are actually more favorable than, it is hinted, they have in some cases been paying.

The competition for orders is very great, and very low

prices are being accepted—in fact, from all that we can learn of the prospects of trade for this year, prices are unnecessarily low and such that but little, if any, profit can be made in mining. The quotations are $4 20@4 50 at Baltimore, and $4@$4 20 at Georgetown, while for important contracts these figures have been considerably shaded, especially from Georgetown. If the greater portion of the products of this region is to be contracted for at these low prices, the proposed combination to sustain prices will be found a necessity, if companies are to declare dividends. No further progress has been made towards bringing about the proposed union of action, which seems to be demanded by the condition of this trade.

Chesapeake and Ohio Canal.—This company has acquired control of WALSH & MCKAIG's wharf at Cumberland, giving them the control of the entire shipping facilities of that city. They have agreed to take off $2 04, each way, on boat tolls, for all boats not paying over $30 trippage, and the boatmen thereupon agreed to freight to Georgetown for $1 25 per ton. The boatmen of the American Coal Company, whose trippages are paid as a rental, and not on account of boat purchase, refuse to boat for that company at the reduced rate, unless their trippage rental is reduced to 25.

Foreign and Gas Coals.—We note the arrival of the ship *Inspector*, consigned to HENDERSON BROTHERS of this city, with a cargo of 1200 tons of Scotch steam-coal. It is being offered on this market at $7. For our friends in Nova Scotia, we have the old story—no contracts yet made for Provincial coals. It is impossible to say what quantity will be taken this year, but it is possible, an average quantity may yet be placed in this market, if prices are put down in accordance with those of our domestic coal. In American Gas Coals, the large contracts all having been made, there is but little to note. The companies that are at work are securing some orders that might not have fallen to them. The strikes in the Penn and Westmoreland district, and on the Youghiogheny River, heretofore mentioned by us, continue without any new features.

Freights.—The market is a little weaker than at the date of our last. It is thought that when the anthracite mines resume work freights will advance temporarily, but there is nothing to indicate that they will rule, through the season, much, if anything, higher than last year. The rates from Baltimore and Georgetown to Boston are, $1 75@$1 90, according to size of vessel; to the Sound, $1 65, and to this city $1 50. By barge, the regular quotation from Baltimore to this city is, $1 60. From this port to Boston the rate is about $1 75 per ton.

Wholesale Prices of Anthracite Coal f.o.b., at the Tide Water Shipping Ports per ton of 2240 lb.

The prices of the Lackawanna, Scranton and Pittston Companies, in the following table, are all that have been fixed as yet for the month of May.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
Lackawanna and Scranton at Elizabethport & Hoboken	4 80	4 90	5 00	5 15	5 60	4 60
Pittston at Newburgh	4 70	4 70	4 80	4 90	5 40	4 45
Wilkesbarre at Port Johnston	....	....	....	....	....	....
Plymouth, R. A.	....	....	....	....	....	....
Susque. Coal Co. at Amboy W.A.	....	....	....	....	....	....
Kingston at Hoboken	....	....	....	....	....	....
Lehigh Coals.						
Old Company at Port Johnston	....	....	....	....	....	....
Old Company's Room Run "	....	....	....	....	....	....
Sugar Loaf at "	....	....	....	....	....	....
Lehigh Coal Exchange "	....	....	....	....	....	....
Honey Brook at Elizabethport	....	....	....	....	....	....
Spring Mt. C. Co. at Hoboken	....	....	....	....	....	....
Beaver Meadow at South Amboy	....	....	....	....	....	....
Schuylkill Coals.						
Schuylkill white ash	....	....	....	....	....	....
Schuylkill red ash	....	....	....	....	....	....
Shamokin white and red ash	....	....	....	....	....	....
N. Franklin	....	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	....	....	....	....

Pittston coal is delivered to carts in NEW YORK or BROOKLYN at 65 cents per ton in addition to the above rates.

	Per ton.
Freight from Hoboken and Weehawken to New York	40c.
" " Elizabethport & Port Johnston to New York	45c.
" " South Amboy to New York	50c.

Freight on Lackawanna coal from Roudout to New York, by boats or barges of the D. & H. Canal Co., 50c. per ton.

Wholesale Prices of Bituminous Coal.

The following prices are principally fixed for the season, except where otherwise indicated.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn, at Greenwich, Philadelphia	$5 20	$6 50
" " at S. Amboy	6 00	6 50
Red Bank Cannel Pa., at Phil.	8 00	8 50
" " at S. Amboy	8 50	....
" Orrel. "	6 00	6 50
Youghiogheny, Waverly Co, at Baltimore	5 25	6 50
Despard, West Va. nominal "	4 75	6 50
Murphy Run, W. Va. at Baltimore, nom.	4 75	6 50
Fairmount, W. Va " nominal	4 75	6 50
Newburgh Orrel, Md. " "	4 75	6 50
Cannelton Cannel, W. Va., at Richmond.	9 50	11 00
" Splint, " " "	5 00	6 50
Peytona Cannel, " " "	9 50	11 50
Straitsville, " At Sandusky, O "	3 65	11 60

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle at Newcastle-on-Tyne	10/6@12/9	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	47/	18 00@22 00
" Gas Cannel "	30/	12 00
Scotch Gas Cannel, at Glasgow, nominal.	25/	7 50
	Gold.	
Block House at Cow Bay, N.S.	2 00	5 50
Caledonia, at Port Caledonia	1 75	5 25
Glace Bay, at Glace Bay	1 80	5 50
Lingan, at Lingan Bay	75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion and Vale mines, at Pictou	2 25	5 75

Steam and House Coals.

Broad Top, at the mine, $1,25; at Amboy	4 75@5 00	5 25@5 50
Cumberland, at Georgetown and Alexandria, Va.	4 20@4 25	....@....
Cumberland at Baltimore	4 40@4 50	5 75@6 25
Clearfield, " Derby," " Kittanning," "Sterling," and " Eureka," at the mines, $1,25; at Greenwich, Phil.	4 60	5 65
James River, carbonite, at Richmond, Va	6 75	9 00
" bituminous, " nom.	4 00	6 25

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove. Chestnut
Pittston coal, in yard	$6 00	$5 40
Lackawanna Coal, del'd	7 60	7 85 7 10
*Wilkes-Barre, delivered	7 60	7 85 7 10
Lehigh & Locust Mountain, del'd	8 00	8 00 7 50
Schuylkill Red Ash del'd	8 25	

The cost of delivering Pittston coal ranges from 40 cents to $1 per ton according to distance from the yard.

* Twenty-five cents less than the above rates are charged to manufacturers.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb.			$23 00
Liverpool House Cannel	"	"	25 00
American Cannel	"	"	16 00
American Orrel	"	"	$15 00@16 00
Straitsville Cannel	"	"	15 00@16 00
Carbonite	"	"	12 00
Cumberland	"	"	9 00
Acadia, Pictou, N. S.	"	"	14

Philadelphia Coal Trade.

PHILADELPHIA, April 22, 1875.

I have absolutely nothing to say—nor had I last week—beyond a "rehash" of news about the strike, prospects of starving, etc., and that is not what you want. There is no change here in freights. Shamokin and Lykens Valley continue to come to this market—and there is not enough material to make a trade report of three lines.

The Committee of Investigation, selected by the Legislature to investigate the acts as compared with the chartered rights of the Philadelphia and Reading Coal and Iron Company, has had a couple of meetings, and has adjourned to May 4th, to begin to hear testimony. The Reading Railroad Coal and Iron Company evidently do not like it, and protest against the unconstitutionality, etc., of the proceedings.

Baltimore, Md. April 20, 1875.

Reported by our Special Correspondent.

WHOLESALE PRICES PER 2240 lb.

ANTHRACITE.

	By cargoes.	In cars.
Wilkes-Barre, " Lee," or " Diamond,"		
Lump, steamboat	$5 15	$5 60
Broken	5 50	5 75
Egg	5 87	6 15
Stove	6 07	6 35
Pittston and Plymouth.		
Lump and steamboat	....	5 50
Broken	....	5 70
Egg	....	6 05
Stove	....	6 25
"Boston," free burning white ash	....	5 50
Egg	5 87	5 70
Stove	6 07	6 05
Shamokin, (red or white ash)	....	6 25
Egg	5 82	6 05
Stove	5 92	6 15
Lykens Valley, red ash, egg and stove	6 02	6 55

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2,240 lb, $7@8 25.

BITUMINOUS.

George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 60	4 75
West Va. Gas Coal f. o. b. at Locust Point	5 50	....
Kanawha Cannel, coarse	13 00	....
Tyrone	7 25	....
Ritchie Mineral of West Virginia	1 00	....

Boston. April 20, 1875.

Reported by our special correspondent.

CARGO PRICES TO TRADE.

Lingan coal	$ 5 75	Westmoreland, and Penn.	7 25
Caledonia	5 00	Waverly Co. Youghiogh'y	7 25
Pictou	6 15	Cannelton Cannel	11 75
Block House	5 60	Cumberland	6 50
Red Bank Cannel	10 00	Anthracite,	6 50@ 7 25
Glace Bay	5 00	" Retail	7 50@ 8 00
Sydney	7 00		

The *Commercial Bulletin* says:

"The position is substantially unaltered. The steady disappearance of the supply is making itself felt very disagreeably, and it is now considered a favor to let a dealer have coal at any price. For the common herd it is about as hard to get this staple as it is to get money in the loan market. Yet there has been no advance in price, for reasons which we printed out at length last week. In this as in other respects the present situation of the coal market is unique.

"Soft coals rule about the same. Cumberland is in good demand, and brings full prices. Small sales of English Channel have been made at $24 for Ince Hall. Provincial coals are dull, and no fresh mined is expected for two or three weeks.

"Total receipts at this port for the week 4,060 tons domestic and no foreign, against 31,028 tons domestic and no foreign for the corresponding week last year. Total receipts since Jan. 1, 78,031 tons domestic and 1,228 tons foreign, against 106,240 tons domestic and 1,052 tons foreign for the same time last year, and 122,455 tons domestic and 2,787 tons foreign for the same time in 1873."

Buffalo, N. Y. April 20, 1875.

Per ton of 2000 lb.

	Slack.	Nut & Slack.	Nut.	Lump
Connelsville coke				5 80
Sterling cannel				6 00
Red Bank				5 75
Youghiogheny coal for gas				4 75
Briar Hill coal		3 25		4 85
Monterey "		3 25	3 60	3 75
Cattish "		3 25	3 60	3 75
Stoneboro "	2 75		3 75	

Briar Hill coal, and Stirling and Red Bank cannels retail at $7 50; all other coals $1 per ton above wholesale prices.

Anthracite f. o. b. vessel.

Grate	6 70	Stove	7 15
Egg	6 70	Chestnut	6 65

Retail prices delivered and screened, $1 per ton additional

Chicago, Ill. April 20, 1875.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants

No change in prices of coal. The contract for 17,000 tons grate coal, for use of the water works, was awarded last week to Robert Law, at eight dollars a ton delivered at the works. Coal to be delivered daily as needed for use.

Retail prices per ton of 2000 lb. delivered to buyer.

	BITUMINOUS.	
Lehigh Lump	$10 75	Briar Hill and Erie 7 50@ ....
Lehigh prepared and car load lots	10 25	Walnut Hill (W. Va.) 6 50@ ....
Lackawanna, Wilkes-Barre and Pittston,*		Midway (West Va.) 6 50@ ....
Grate, egg, and chestnut.	10 00	Cannel 8 00@ 9 00
Stove or range	10 00	Blossburg 8 00
		Indiana Block 6 00
		Hocking "Brooks" 6 00
		Wilmington and Illinois 5 00

*75 cents off these prices for car load lots to country dealers and manufacturers.

Cincinnati, O. April 20, 1875.

Coal trade here very dull, and no material change in prices. We quote:

Per ton of 2000 lb.

	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	3½c.@9c.	—
Pomeroy coal	6c.	—
Cannel coal	16c.	—
Semi Cannel	8c.	—

The following are retail prices delivered:

Youghiogheny	— c.	$3 35
Pomeroy	— c.	2 80
Cannel	— c.	5 60
Kanawha Semi Cannel	— c.	3 35
Anthracite		9 50
Foundry coke	8c @10 c.	—
Soft coke	8 c @10 c.	—

Cleveland, O. April 20, 1875.

Reported by our Special Correspondent.

Per ton of 2000 lb. on cars.

Youghiogheny, l'p	$4 40	Columbiana	$3 00
Youghiogheny, nut	3 40	Strip Vein	3 20
Briar Hill, according to quality	$3 85 to 4 00	Mountain Blossburg (blacksmith)	5 50
Massillon	3 65	American Cannel Coal Co.s Cannel	4 50
Hocking Valley	3 25		
Straitsville	3 25		
Anthracite, Lackawanna on cars, Egg			$6 85
" " " "		Stove	7 50
" " " "		Chestnut	7 00
Youghiogheny Coke, " "		here	5 25
Connellsville " "		"	5 50

50 to 75 cents per ton additional for delivery at retail.

Detroit, Mich. April 20, 1875.

Specially reported by Messrs. ROBINSON & KEYS, dealers in all kinds of coal.

There has been quite an increased demand for supplies during the past week, which still continues. We note the arrival of a cargo of soft coal from Cleveland, the first of the season.

Per ton of 2000 lb.

Lehigh Lump, per ton	$10 50	Blossburg	8 50
Lehigh " prep. sizes.	10 00	Briar Hill	7 50
Wilkes-Barre, Grate and Egg	9 00	Willow Bank	7 00
Wilkes-Barre, Stove and Nut	9 50	Erie	7 50
		Massillon	7 00

Erie, Pa. April 20, 1875

Reported by our Special Correspondent.

Wholesale, per ton of 2,000 lb.

Bituminous f.o.b.

Briar Hill lump	$4 00	Beaver lump	$4 00

Indianapolis, Ind. April 19, 1875.

Specially reported by Messrs. H. MCCOY & CO.

Per ton of 2000 lb.

BITUMINOUS.

Wholesale on board cars in city.

Block coal	$2 50@2 75	Indiana cannel	6 75
Best "	2 40@ 2 50	Hocking Valley	4 25
Block Nut, per car	18 00	Youghiogheny	5 00
Highland " "	18 00	Blossburg (smithing)	6 50
Block slack, per car load.		Piedmont "	7 75
Peytona, cannel per ton	8 75	Gas coke, per bushel.	80

ANTHRACITE (Lackawanna).

Grate	$8 70	Chestnut	8 60
Egg	8 70	Stove	8 85

Retail, per bushel of 70 lb

Block	16c.	Peytona Cannel	32c.
Highland	14	Indiana "	26
Highland Nut, dom. use	9	Youghiogheny	24
Block " "	9	Blossburg	26
Slack, steam, "	8	Piedmont	30
Block & Highl'd Mt. steam—			

ANTHRACITE.

	per ton.		per ton.
Grate	$11 00	Stove	$11 00
Egg	11 10	Chestnut	11 00

Louisville, Ky. April 20, 1875.

Specially reported by Messrs. BYRNE & SPEED.

The price of coal declined yesterday; is worth in the river 8 to 8½ cents. Our retail prices are as follows:

Pittsburgh, per load of 1900 lb	$3 00
Pine Hill	2 75
Buckeye Cannel	5 00
Peytona Cannel	5 50
Nut and Slack	2 25
Pine Hill nut	2 25
Kentucky lump, per load	
" nut, "	
" Slack "	
City-made Coke, per bushel	
Pittsburgh, wholesale, per bush.	
Kentucky on cars at wholesale, per bush.	
Anthracite, per ton	$10 to $10 50

Milwaukee, Wis. April 19, 1875.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail prices per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 50
Lehigh Prepared	10 50	Blossburg	8 00
Lackawanna	9 50	Pittsburgh	7 50

New Orleans, La. April 17, 1875.

Please repeat our quotations of 10th inst. Though the market price is said to be 35 cents, wholesale, there is continually some underhand sales made below that figure.

Pittsburgh coal, retail, per bbl	75c.
" wholesale	35c.
" to steamboats, per box	50c.
" to manufacturers, per bbl	60c.
" shipments per hhd	$7 00
Anthracite, retail, per ton	$12 oc@13 00
" wholesale per ton	8 00
Spadra (Arkansas) coal, retail, per bbl	75c.
Mt. Carbon, wholesale, per bbl	45c.
" " retail per bbl	65c.
Virginia Cannel, per bbl	90c.
Scotch Cannel, per bbl	1 00

Pittsburgh, Pa. April 20, 1875.

The long "lock-out" of the manufacturers has ended, they having receded from their demand for a reduction in boiling, and signed the old scale of prices. Most of the mills start up this week, paying $5.50 per ton, on a selling price of 2¼ cents for iron. The resumption will make a better local demand for coal. A brisk demand for coke still continues. Prices for coal and coke remain unchanged.

Per ton of 2000 lb. and Bushel of 76 lb.

	per ton.		per ton
Youghiogheny coal	$2 00	Pittsburgh retail delivered	
" coke	2 00@2 25	per bushel	9c@10c
Connellsville coal	2 10	Anth'cite on cars Lehigh	$7 75
" coke	$2 25@2 50	" " Wilkes-	
Pittsburgh coal	1 85	Barre	6 75

Twenty-five to fifty cents per ton additional for delivery.

San Francisco.

From the *Commercial Herald*, April 8, 1875.

Imports from January 1st to April 1st, 1875:

Anthracite, tons	3,750	English, tons	20,195
Australian, tons	22,049	Vancouver Island, tons	16,923
Coos Bay, tons	7,800	Rocky Mountain, tons	22
Cumberland, tons	1,838	Seattle, tons	8,176
Mt. Diablo, tons	40,880	Bellingham Bay, tons	1,840

We are in receipt of free coast supplies, including 735 tons per steamers *Eulport* and *Empire* from Coos Bay, 1,900 tons Bellingham Bay per *Germania* and *Amethyst*, 807 tons Seattle per *Osmyn*. The market for spot cargo parcels Australian, afloat, has been poorly supplied, giving dealers a chance to work off a portion of their surplus stock at a slight advance from late ruling rates. There is no Cumberland in first hands, all held by dealers. California Mt. Diablo supply is liberal, and this, with other coast mines now being developed, promises a large increase ere long. Black Diamond and other Mt. Diablo Coal is exclusively used for steam purposes by factories and inland steamers. The coarse commands $8 25 and the screenings $6 25 per ton. We quote Coos Bay at $10; Wellington, $11@12; Australian, by the cargo, $10@10 50; Bellingham Bay, $8 50. The *Enoch Talbot* from Seattle, adds 1,800 tons to the stock. The *Wellington*, from Nanaimo, brings 916 tons.

Toledo, Ohio. April 20, 1875.

Specially reported by Messrs. GOSLINE & BARBOUR.

The following are the quotations on Anthracite and Bituminous coals at Toledo:

Per ton of 2000 lb. on cars.

Hocking Valley	$3 40	Massillon	4 20
Straitsville	3 40	Youghiogheny	5 00
Shawnee	3 40	Blossburg	7 50
" nut	2 90	Cumberland	7 50
Briar Hill	5 50	Connellsville coke	7 00

Anthracite.

Grate, screened	$7 75	Stove, screened,	$8 25
Egg "	7 75	Chestnut "	7 75
Lehigh Lump	9 50		

40 cents to $1 per ton additional for delivery at retail.

Halifax, N. S. April 19, 1875.

Reported by our Special Correspondent.

Prices per ton of 2240 lb. in gold.

Sydney (old mines)	$4 50	Little Glace Bay	3 50
Gowrie	3 50	Blockhouse	4 00
Victoria	3 50	Albion (at Railroad)	4 25

Montreal. April 20, 1875.

Specially reported by Messrs. ROBERT ADAMS & Co.

Wholesale per ton of 2,240 lb.

Scotch Steam	$6 25	Cape Breton Steam	$5 75
Pictou "	6 00	Newcastle Smiths	
Anthracite at retail, 2,000 lb., delivered, less 5 per cent.			
Egg	$8 50	Chestnut	9 00
Stove	9 50		

Toronto, Ont. April 19, 1875.

Reported by our Special Correspondent.

ANTHRACITE.

	per ton.		per ton.
Broken	$7 65	Chestnut	$7 65
Egg	7 65	Lehigh	9 00
Stove	8 15		

BITUMINOUS.

Blossburgh	7 50	Screenings	5 00
Briar Hill	7 00	Soft Nut	5 50

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton.*	From Upper Lehigh.	From Lehigh and Sugar Notch.
To ‡ Newark, N. J. via Central Railroad of New Jersey	2 89	2 73	2 86	3 24	3 45
‡ Mauch Chunk, Pa. via Central Railroad of N. J.	16	..	56	51	72
‡ Phillipsburg, N. J.	1 09	93	1 34	1 44	1 65
‡ Elizabethport, Port Johnston, Hoboken and South Amboy, N. J., shipping and wharfage 35c. a ld.	2 47	2 31	2 80	2 82	3 03
High Bridge, N. J.	2 40	2 20	2 80	2 79	3 09
Somerville and Raritan, N. J.	2 80	2 60	3 20	3 19	3 49
Elizabeth, Cranford, Westfield and Elizabethport, for consumpt on	2 95	2 75	3 35	3 34	3 64
¶ Jersey City, N. J., and New York, via Morris Canal	2 85	2 35	3 17	3 24	3 54
Andover, via Delaware, Lack. and and Western RR	3 30	3 10	3 70	3 69	3 99
§ Trenton, Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

* Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

¶ 20 cents per ton additional for transferring coal from boat to boat, and 30 cents per ton for reshipment of same from wharves.

The following rates of freights and tolls on Schuylkill coals are to take effect from and after March 1, 1875:

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove.	From Tamaqua.	From Port Carbon.	From Mount Carbon.	From Schuylkill Haven.
To * *Port Richmond*, for shipment, via P. & R. R. R., Main Line	1 87	1 82	1 75	1 74	1 67
Philadelphia, Retail yards	1 97	1 92	1 85	1 84	1 77
Harrisburg, via Lebanon Valley Branch	1 23	1 80	1 73	1 72	1 65
Allentown, via East Pennsylvania Branch	1 52	1 47	1 40	1 39	1 32
Lancaster, and Points on Lancaster Branch, via R. & C. R.R.	1 57	1 52	1 45	1 44	1 37
Dauphin, via Schuylkill and Susquehanna Branch	62	....	1 25 via	1 24 Aub	1 17 urn.
Jonestown, via Lebanon and Tremont Branch	86	...	1 69	1 68	1 61
Lebanon, via Lebanon and Tremont Branch	90	....	1 88	1 87	1 80

* On and after March 1, 1875, a charge of fifteen cents per on will be made for shipping anthracite coal at this point.

From *Tamanend* to *Catawissa*, via Catawissa and Williamsport Branch Railroad 94

From *Tamanend* to *Williamsport*, via Catawissa and Williamsport Branch Railroad 1 39

Freights on Bituminous Coals from the Mines to Tide-Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles) the charge is 3 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $3 75 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 50 cents per net ton.

From Cumberland to Baltimore, (178 miles) $2 31 per ton of 2240 lb., or $2 02 per net ton, and 4 cents per gross ton for use of cars.

From Cumberland to Georgetown, (152 miles) by canal. Rates undecided, pending settlement of tripl ages and tolls on boats

From the Mines to Piedmont, (from 4 to 10 miles) 5 cents per ton of 2240 lb per mile on distances less than 5 miles, and 4 cents per ton per mile on distances not over 10 miles.

From Piedmont to Baltimore, (206 miles) $2 69 per ton of 2240 lb., or $2 40 per net ton.

From any point in the Kanawha Valley to the James River wharves below Richmond, (say 350 miles) by C. and O. R. R., including terminal charges, per ton of 2240 lb or Cannel coal, $4 50.

Do., do., for Semi-Cannel or Splint, per ton of 2240 lb., subject to rebate on shipments of 5000 tons or more, $3 65.

From Irwin to W. Phila. (say 332 miles) per P. R. R. Penn. Westmoreland gas coal, per ton of 2000 lb $4 75

From Osceola to W. Phila. (say 248 miles) per T. & C. R. R., per ton bituminous coal of 2000 lb 3 30

From Fairmount and Clarksburg to Baltimore (say 300 miles) via B. & O. R. R., including loading, per 2000 lb 4 75

On through coal after deducting drawback

From Richmond, Va., to New York, via vessel, 392 miles per 2240 lb.. 1 75

" " " *Boston*, about 650 " " " 2 25

" " " *Philadelphia*, 292 " " " 1 25

From the Mines to Richmond, via James River and Kanawha Canal, 15 miles 15

Freights.

Per ton of 2240 lb.

Ports.	From Baltimore and Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me.	2 50	....
Albany	....	....
Amesbury, Mass	....	....
Bangor, Me.	2 25	....
Bath, Me.	2 00	....
Baltimore	....	....
Boston, Mass	1 85	1 80
Bridgeport, Ct	1 60	85
Bristol, Ct.	....	1 30
Derby	....	1 10
Dighton	....	....
East Cambridge	....	†† 1 80
Fall River	1 65	1 30
Hackensack	....	....
Hartford	2 10	1 40
Hoboken	....	....
Hudson	1 75	....
Jersey City	....	....
Middletown	....	....
Mystic	....	....
Newark	....	....
New Bedford	1 65	1 30
Newburyport	2 00	2 00
New Haven	1 60	85
New London	1 65	1 00
Newport	....	1 30
New York	*1 60	§ 40
Norfolk, Va.	....	....
Norwalk	2 00	1 00
Norwich	1 70	1 25
Pawtucket	1 85	‡‡ 1 40
Philadelphia	....	....
Portland	1 85	1 75
Portsmouth, N. H.	2 00	1 90
Providence	1 70	1 30
Petersburg, Va	....	....
Richmond, Va	....	....
Rockport	....	....
Saco	....	2 10
Sag Harbor	....	1 15
Salem	2 00	1 80
Savannah, Ga.	....	....
Stamford	....	85
Stonington	....	1 10
Taunton	....	1 80
Trenton, N. J.	....	....
Troy	....	....
Warren	....	1 30
Washington	....	....
Wareham	1 85	1 30
Wilmington, Del	90	....

§ Under 150 tons, 50c. per ton.

†† 3c. per ton per bridge extra.

‡‡ Towing extra.

* This is the rate by barge.

THE BRITISH COAL AND IRON TRADES.

April 3, 1875.

North of England.—Business in both coal and iron has been interrupted during the last week by the Easter holidays. There is a good demand for gas coals, but other descriptions are dull, with a downward tendency of prices. Coke is in good demand. The following are the quotations at the Denham pits: best households, 13/@15/; secondary sorts, 10/ 6d.@12/ 6d.; unscreened manufacturing, 5/@6/ 6d.; screened, 7/@8/; gas, 8/ 6d.@10/ 6d.; small, 2/ 6d.@3/ 6d. On change, at Middlesbrough, on the 30th ult., there was a good attendance, but owing to the holidays no business was done. Pig iron is quoted at 63/ 6d. for No. 1; 58/ 6d.@59/ for No. 3, and 56/@56/ 6d. for No. 4 forge. Rails are quoted at £7 for ordinary sections, and £7 5/@£7 10/ for light ditto; common bars, £7 15/, and puddled bars, £5@£5 2/ 6d. At the present time rails cannot be made at a profit, and as a consequence, but little is being done. There is some inquiry from Northern Europe, and a few orders have been received. There has been a large inquiry for forge qualities of pig iron, both for local and shipping account. Nothing further has been done in the arbitration of the labor question in the coal trade. It is believed that the arbitrators will sit about the 15th inst. at Newcastle-on-Tyne.

Yorkshire and Derbyshire.—The coal trade has been rather

quiet; although the collieries were stopped for several days, it did not interfere with the supply as the loaded wagons more than met the requirements. The labor question is creating no disturbance at the present time, the miners submitting to the 10 per cent. reduction. There is some fear that the topmen will not submit to a reduction of 25 per cent. At Barnsley, there is a fair amount of work doing at the foundries, and an increased demand for Bessemer steel rails. Air compressing engines for underground haulage, of late, have been in increasing request. Many of them are now to be found in some of the largest collieries in the West Riding, as well as to the South of Sheffield. Coal cutting machinery does not appear to make great progress, the only place that it has been fully tested being the Wharncliffe Silkstone, and there some of the machines have proved so far satisfactory, as to lead to the ordering of two or three for the cutting of the thin seams. The demand for Bessemer and crucible steel at Sheffield is improving.

Barrow-in-Furness.—There have been a few orders placed during the past week, but business was limited. Buyers are withholding their orders as much as possible, with the hopes of driving the makers to a reduction in prices. No. 1 Bessemer pig is quoted, f.o.b., at £4 10/; No. 2, £4 7/ 6d.; No. 3, £4 5/.

Manchester.—During the past week the inquiries for coal have not been so great, but, upon the whole, considerable business is doing, and prices are generally firm. In the Tyldesley district the quotations at the pits are as follows: Best coal 13/ 6d @14/; steam coal for shipping purposes, 11/; best burnie, 7/ 9d.@8/; common ditto, 7/@7/ 6d.; best slack, 6/ 6d.@7/ per ton. In the Wigan district there is a very fair inquiry for gas coals, which are quoted as follows: Ordinary cannel at the pits, 28/@30/; best screened gas coal, 14/@14/6d., and unscreened ditto, 12/@12/3d.

Wolverhampton.—The coal masters met at the Queen's Hotel, at Birmingham, on the 26th ult., and resolved to make no alteration in the prices of labor or coal, and the iron masters will, most probably, be bound to follow the same action. The official accountant has given the average net price received for bars for the quarter ending Feb. 27, as being £9 11/ 5½d. This fixes puddlers' wages at 9/ 6d. per ton, and millmen's wages in proportion, which is a reduction of about 3d. per ton for the ensuing quarter. Common cinder pig iron is quoted at £3@£3 5/; mixed mine cinder, £4; all-mine hot air, £5@£5 5/; marked bars, £10 10/, and unmarked ditto as low as £3 15/; per ton. The demand for iron is generally rather quiet. The demand for coal is a very fair one. The prices at Dudley are: Best thick coal, 18/; seconds, 13/; lumps, 12/; bright engine slack, 4/ 6d.; steam coal slack, 3/ 6d. The demand for white stone and gubbin is active, and prices are well maintained at 21/@22/ per ton.

Monmouthshire and South Wales.—The strike and lock-out continue without any great change. Although the quantity of coal being raised is not large, yet it more than suffices, and prices are constantly declining, so that at the present time a further reduction looks inevitable. The current prices of manufactured iron are so low, that even if the men submit to the proposed reduction, there will be no inducement for makers to relight their fires. The coal and iron masters connected with the Association have agreed to find work for a few of the men at 1870 wages, to keep them off the parish rates; and the parochial authorities have consequently resolved, that no relief shall be given to men who have been offered work and refused it. Double screened steam coal is quoted at 19/@20/, f.o.b. Cardiff; colliery screened, 18/@19/; small, 6/ 6d.@7/ 6d. Hot-blast foundry iron is quoted at £4@£4 10/; forge, £3 15/; refined, £4; common bars, £9@£9 10/.

Scotland.—On Tuesday, 3,500 tons of pigs changed hands at 72/ 3d. and 72/ cash, and 71/ 3d. one month fixed. A further reduction has been made in several of the principal makers' brands, which are as follows: Gartsherrie, No. 1, 80/; No. 3, 76/; Coltness, 84/ and 74/; Summerlee, 82/ 6d. and 72/; Langloan, 82/ and 74/; Govan, 73/ and 71/ 6d.; Calder, 82/ 6d. and 73/; Schotts, 82/ 6d. and 74/; Carnbroe, 78/ and 72/ 6d.; Monkland, 73/ and 72/; Clyde, 75/ and 73/; Glengarnock, 80/ and 72/ 6d; Eglinton, 71/ and 69/; Dalmellington, 71/ and 69/; Kinneil, 75/ and 71/; Carron, 75/ and 72/ 6d. The shipments of pig iron from Scotch ports during the week ending the 27th March amounted to 10,325 tons, showing a decrease of 276, as compared with those of the corresponding week of 1874. The imports of Middlesbrough pigs at Grangemouth for the week were 3,740 tons, being 810 more than in the corresponding week of last year. The prices of coal have again fallen, notwithstanding that it was believed they had reached the lowest point. The wholesale rates in Glasgow are—for Wishaw Main, 8/ 3d. to 9/; Splint, 9/ 3d. to 10/; household, 8/ 9d. to 14/; steam, 10/ to 11/ 9d.; smithy 15/. In the Fife and Clackmannan district the masters have conceded 5 per cent. of the proposed reduction, so that now it will be but 15 per cent. This will allow the miners to make 4/ 3d.@4/ 9d. per day of eight hours.

Import Duties.

The following are the duties in Gold:

Flat Iron, not less than 1, nor more than 6 inches wide, nor less than ¾, nor more than 2 inches thick. *Round Iron*, not less than ¾, nor more than 2 inches in diameter, and *Square Iron*, not less than ¾, nor more than 2 inches square per pound 1 c.
Flat Round or Square Iron, of larger or smaller sizes than the above mentioned, per lb ..... 1½ c
Provided, that all iron in slabs, blooms, loops, or other forms, less finished than bars, and more advanced than pig iron, except castings, shall pay the same as iron in bars.
Provided, that none of the above iron shall pay less than 35 per cent.
Railroad Bars—Iron.....70c. per 100 lb.
Railroad Bars—Steel.....$1.25 per 100 lb.
Boiler plates, or other plate iron not less than 3-16 of an inch thick, per lb..... 1½c.
Scrap castings per ton..... $6 00
" *wrought* " " 8 00
Pig iron per ton..... 7 00
Iron ore 10 per cent. *ad valorem*.
Antimony, crude or regulus, 10 per cent.
Copper Ore—On all fine copper contained therein, 3c per lb.
Old Copper, fit for manufacture only, 4c. per lb.
Copper, pigs, bars, ingots or plates, 5c per lb.
" sheets, bolts, nails, spikes, rods, pipes, &c., 45 per ct.
Tin, in bars, blocks or pigs, and grain tin, free.
Tin Plates, or sheet, and terne or taggers tin, 1 1-10c. per lb.
Lead—Bars or pigs, 2c. per lb. Old lead, for manufacture only, 1½c. per lb. Pipe, shot and sheets, 2¾c. per lb.
Zinc, in blocks or pigs, 1½c. per lb; in sheets, 2½c. per lb.; manufactures of, 35 per cent.
Quicksilver, free.

IRON MARKET REVIEW.

New York.

April 23, 1875.

American Pig.—Business is about as dull as can be short of a total cessation. The wants of consumers are very light, and they are only buying for immediate necessities. Although the make is not large, yet it more than suffices, and with prospects of an early full supply of coal, there is nothing apparent to prevent a further decline in prices, which, however, would be considerable weakness now. When the orders taken early in the season are filled, if no improvement in the demand takes place—and at the present time there is nothing to indicate that there will be such before fall—stocks will accumulate, and with numerous speculative lots on hand, will create a desire to sell; to do which, even now, would require a concession of two to three dollars per ton to place a round lot. Furnace companies have not the inclination or ability to carry large lots any great length of time, and they have learned that to dispose of them they must take what they can get, regardless of what the iron costs, or their views of its value. In Scotch pig iron, at the present time, they have an example of prices being controlled strictly by the law of supply and demand. The feeling among the trade is a very gloomy one. We quote No 1. foundry at $27@$28, No. 2 $26; Forge $22@$26 according to quality. There is a shyness with parties requiring good iron, about purchasing from stocks now on hand, as most of the furnaces were driven to a change of fuel, and the qualities of their productions are unknown.

Scotch Pig.—The market for this article is completely demoralized. The arrivals are greater than the market can take. 200 tons of Eglinton and 100 tons of Gartsherrie have gone into store, and 200 tons of Coltness were forced on the market, and sold on private terms, said to be at a very low figure. 200 tons of Coltness arrived yesterday by the *California*, for which $36 is being asked, with no prospects of realizing that figure. The demand from consumers is very light, and in view of the supplies and increasing stocks, speculators are only making exceedingly low offers. There is no use disguising the fact that concessions of one to two dollars per ton have to be made to induce buyers to take even a small quantity. Every report, of late, from Glasgow shows more weakness in that market. The open quotations are, Coltness, $35@$36; Glengarnock, $36 50; Eglinton, $32@$33. It is reported that a sale of the latter brand was made at $31.

Rails.—There are some sales reported, with particulars not transpired. We quote at $48@$50 at mills for iron rails, and $72 50@$75 for steel.

Old Rails.—We are reported a sale of 1800 tons of D. H. at Montreal and Quebec at $18 in bond. We hear of offers in this market at $23.

Scrap,—We note a sale of 150 tons on private terms, and quote at $35 ex-yard.

Boston.

April 20, 1875.

The *Commercial Bulletin* says:

Pig is by all odds duller than ever the past week. The drop of 100 a hundred on light iron in the junk market, and the placing of the city's contract for 1000 lamp-posts with the Whiting Foundry at 2½c, seem to have impressed the market that "something is just about to happen." The lamp-post bid called for good, well finished castings, each post to weigh 350 pounds. Offers were in from all quarters of the Union, and ranged from 2 5-16 to 3c per pound. One or two parties have been courageous enough to offer good prime No. 1 X at $29, without being taken up, while brokers still quote to reporters $32@$33. The primary markets, notwithstanding the coal riots, do not tone up, but continue to offer lots here at $27@29 No. 1; $24@27 No. 2; and $22@26 Grey forge.

Bar is steady quoting and selling at $60. The stock has again begun to work down a trifle, but yet secures no buyers at features. There is rather less irregularity than noted a week ago, but still there are a few spots where the right buyers do find a slight set down.

Steel is moving along in a quiet way, rather less doing than previously reported. We quote American tool 15@15½c; American Machinery 9½@10c; do. tires at 6½@7c; English Tool, 16@17c.

Copper was advanced 1c. on Saturday last, the result of a combination with the mining companies. The demand from the manufacturing companies had just began to be felt, but this turn has rather checked the consumption of new, and turned attention more fully to old metals. We quote spots and futures firm at 22¼@22½c. We quote New Sheathing 28c; Bolts and Braziers 30c; Yellow Metal Bolts 23c.

Lead is having a fair business, with prices generally quite steady. We quote domestic 5¾c. Sheet and Pipe 6c'y; Tin-Lined Pipe 16¼c; Bar lead 9c, less usual trade or 10 per cent. discount.

Spelter is in better request at $7 30 gold for Sicilian, and 6¼ currency for domestic.

Tin is lower, the result of the coming along of heavy lots both of Straits and English. We quote Straits 20; Banca 24½; Refined English 19¾c gold. Plates are active; we quote Charcoal I. C., $10@12 50; Coke $8@10; and Terne at $8@12 50 per box, currency.

Cincinnati.

April 20, 1875.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

The market for pig iron remains without material change. We quote:

CHARCOAL.		
Hanging Rock, No. 1, Foundry	$28 00@29 00	—4 mos
" No 2, "	27 00@28 00	—4 mos
" Mill	26 00@ —	—4 mos
Tennessee No 1, Foundry	27 00@28 00	—4 mos
Tennessee. No. 2 "	26 00@27 00	—4 mos
" Mill	26 00@ —	—4 mos
Missouri, No. 1, Foundry	30 00@32 00	—4 mos
STONE COAL.		
Ohio No. 1, Foundry	27 00@28 00	—4 mos
" No. 2, "	26 00@27 00	—4 mos
Ohio Mill	25 00@26 00	—4 mos
Missouri, No. 1, Foundry	28 00@29 00	—4 mos
" No. 2, "	27 00@28 00	—4 mos
" Mill	26 00@ —	—4 mos
CAR-WHEEL.		
Hanging Rock, C. B.	45 00@50 00	—4 mos
Tennessee "	40 00@45 00	—4 mos
Missouri "	40 00@45 00	—4 mos
Alabama "	40 00@45 00	—4 mos
BLOOMS.		
Charcoal	75 00@ 80 00	—cash
SCRAP IRON.		
Cast	75@ 90	—cash
Wrought	1 10@ 1 50	—cash

Chicago.

April 20, 1875.

Specially reported by Messrs. ROGERS & Co., dealers in Scotch and American pig iron.

Quotations are as follows:

No. 1 Coltness	$46 00@ ....
No. 1 Gartsherrie	45 00@ ....
No. 1 Summerlee	44 00@ ....
No. 1 Glengarnock	42 00@ ....
No. 1 Eglinton	40 00@ ....
Warner's "American Scotch"	41 00@ ....
Massilon No 1 Foundry	37 00@ ....
No. 1 Grand Tower Mo. ores (Bituminous)	33 00@ ....
No. 2, " " "	30 00@ ....
No. 1 Mill	28 00@ ....
Union "A" 1 (Anthracite)	32 00@ ....
Union "B" 1 (Anthracite)	30 00@ ....
No. 1 Lake Superior (charcoal)	32 00@ ....
No. 2 Lake Superior "	30 00@ ....
No. 3 Lake Superior "	33 00@ ....
No. 4 Lake Superior "	35 00@ ....
Bessemer Steel Rails	85 00@90 00
New Iron Rails	55 00@ ....
Old Rails	28 00@30 00

Cleveland.

April 20, 1875.

Specially reported by Messrs. C. E. BINGHAM & Co., dealers in pig iron and iron ore;

No. 1, Lake Superior Charcoal	33 00@....
No. 2, " " "	32 00@....
No. 3, " " "	33 00@....
No. 4, " " "	34 00@....
Nos. 5 and 6 "	35 00@....
No. 1, Bituminous foundry	30 00@....
No. 2, " "	28 00@....
No. 1, " Gray Forge	26 50@....
American Scotch, No. 1, Cherry Valley	32 00@....
" " No. 2	28 00@....
No. 1, Massillon	31 00@....
B—1, "	29 00@....
No. 2, "	27 00@....

Louisville.

April 20, 1875.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is quiet, and sales are comparatively light.

The usual time, 4 months, is allowed on the quotations below.

HOT BLAST—CHARCOAL.	
No. 1 foundry, from Hanging Rock Ores	$28 00@29 00
No. 2 " " "	26 00@27 00
No. 1, Mill, from " "	25 00@ ....
No. 1, foundry, from Alabama, Georgia and Tennessee ores	26 00@27 00
No. 2, foundry, from Ala., Geo'a and Tenn. ores	25 00@26 00
No. 1, Mill, from " " " "	25 00@ ....
HOT BLAST—STONE COAL AND COKE.	
No. 1, foundry, from Hanging Rock ores	27 00@28 00
No. 2, " " " " "	25 00@26 00
No. 1, Mill, " " " "	24 00@25 00
No. 1, foundry, from Ala., Geo'a and Tenn. ores	26 00@27 00
No. 2, " " " " "	25 00@26 00
No. 1, Mill, " " " "	24 00@25 00
No. 1 foundry, from Missouri ores	28 00@29 00
No. 2 foundry, from Missouri ores	27 00@28 00
No. 1 Mill, from Missouri ores	27 00@28 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock ores		40 00@50 00
" " Tennessee "		35 00@37 00
" " Alabama and Georgia ores		38 00@40 00
" " Kentucky ores		30 00@42 00

Pittsburgh. April 20, 1875.

The *Commercial* of April 17, says:

"The inquiry for pig metal during the past few days has been fair, and the resumption of the rolling mills has infused a tolerable degree of life and firmness into the market. The demand for metal has not been up to what the most sanguine expected, as the mills are generally pretty well supplied with metals purchased some weeks or even months ago, but not yet delivered. This stock of iron will probably be sufficient for the ordinary consumption of the rolling mills during the next thirty days, and if the market for manufactured iron proves favorable, an increased inquiry may then be looked for. The existing coal strikes and supposed short supplies of metal also create a firm feeling among holders, some of whom predict an important advance in prices. But it must be borne in mind that the circumstances of the bar iron manufacturers will not allow them to pay any very marked increase over present rates, and that an attempt on the part of the holders to put pig metal up five dollars per ton would be likely to cut off, nearly, if not quite, all the demand.

"Most of the transactions thus far have been at current rates, and yesterday there was a moderate inquiry at these figures. Makers of leading brands of grey forge irons, however, instructed their brokers yesterday morning to hold at $25 00, which is now the general asking price. No sales were made at the advance except one lot of extra grey forge which brought that figure.

"The trade in muck bar, blooms, and scrap-iron has been rendered less active by the cessation of the lock-out and in consequence prices are easier. Receipts of scrap iron continue liberal, but nearly all that is coming in was contracted for some time ago. We report the following sales:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

100 tons extra grey forge	$25 00—4 mos
600 tons grey forge	24 00—4 mos
200 tons grey forge	24 00—4 mos
200 tons grey forge	24 00—4 mos
200 tons grey forge	24 00—4 mos
100 tons grey forge	23 25—cash.
100 tons close grey forge	23 00—cash.
200 tons white and mottled	21 50—cash.
100 tons mottled	20 25—cash.

ANTHRACITE.

30 tons No. 2 extra	$25 50—4 mos
30 tons carbonized	24 00—4 mos

HANGING ROCK CHARCOAL.

85 tons Nos. 2 to 1 $28 00@33 00—4 mos."

Quotations are:

No. 1 foundry	$26 00@28 00—4 mos
No. 2 foundry	24 50@26 00—4 mos
Grav forge	23 00@24 00—4 mos
White and mottled	22 00@23 00—4 mos

San Francisco. April 1, 1875.

From the *Commercial Herald*.

The market is without notable change. We have no stock of Pig Iron in first hands. We quote Scotch spot parcels nominal at $47 for Glengarnock No. 1 and $45 for Eglinton. To arrive in summer, the former is offered at $40 and the latter at $36@37. The general market for Iron, Steel, etc., is without important change, and no large sales to record. The consumptive demand of Pig Iron is steadily increasing on this coast.

St. Louis. April 16, 1875.

Railroad iron is without change, although there is considerable inquiry for rails. Prices range from $53 to $58 per ton, for 35 to 70 pound rails. Railway supplies are in fair demand, and some of the large houses are doing a good trade. Pig iron has improved somewhat since our last, although there is no change in prices, nor any immediate prospect of improvement, except in a larger movement. Three furnaces went into blast the past week; one, the Midland Charcoal Furnace, for the first time. The Missouri Furnace Company, and the South St. Louis Iron Company, are now running on stone coal pig for Bessemer purposes, these two companies having several thousand tons ordered ahead for the Joliet Steel works and Chicago mills.

We are informed of a sale lately made of 6,000 tons charcoal iron, the product of the Scotia Iron company, being nearly the amount of stock on hand. The Moselle furnace is said to have a little over 4,000 tons on hand, and it is probable that the stocks of charcoal pig, made on the Atlantic and Pacific Railroad from the Meramec ores, do not vary much from 5,000 tons. It is said that the stocks of charcoal pig at Iron Mountain, Irondale, and Pilot Knob on the Iron Mountain Road, do not exceed 3,000 tons. A large reduction has been made in the cost of production of iron in Missouri the past year, and furnacemen are better satisfied to get present prices. Iron Mountain ore has been reduced to $6 per ton since March 22d, and Meramec ores to $5 50 per ton. Bar iron has remained without any change in prices at the combination of $2 60. Since the opening of river navigation there has been a more active movement, and quite a fair trade at those rates.

The prospects at the mines are said to be fair for an increased shipment of ores, over last season. The Iron Mountain Iron Company are shipping about forty car loads of ore a day to St. Louis, and a large number of barges have left this point since the opening of river navigation, loaded with ore for Pittsburgh and the Ohio Valley. The Midland Furnace, near Steelville, Mo., went into blast, for the first time, on the 10th inst. The Irondale Furnace, Washington County, Mo., went out of blast March 22d, after a run of sixteen months, the longest it had ever made. This furnace has a 9½ foot bosh, and the average for the whole time was nearly twenty-two tons per day, a total of 10,306 tons, over 9,000 tons being No. 1 iron, which is certainly a very creditable record, and only exceeded by one furnace in Missouri—the Scotia.—*Railway Register*.

METALS.

NEW YORK, April 23, 1875.

Gold Coin.—During the week past gold has ranged from 114¾ to 115¼, and closed yesterday at 115.

Bullion.—Fine silver bar is quoted at $1 24½@1 26; gold, per ounce, and fine gold bar, at par ($20 67, gold, per ounce) to ¼ per cent. premium.

Copper.—We note sales aggregating about 150,000 lb. at 22½c.@22¾c., with the latter figure freely offered now, without finding sellers. London quotations are without change. Manufacturers are buying as little as possible, although many have low stocks. From our London advices dated the 9th inst., we glean the following: Messrs. JAMES & SHAKSPEARE say: "For Chili bars there has been a strong enquiry since Friday last, and values have gradually advanced about 40s. per ton, good ordinary brands being dealt in from £81 to £82 cash and extended prompt, and picked marks at £80. 15s. to 82 cash. but the transactions were somewhat restricted in consequence of many of the holders having withdrawn for higher prices. On 7th inst., the Chili telegram came at hand, advising charters for the last half of March as 1,700 tons, of which 1,000 tons in bars and ingots, 450 tons pure in ores and regulus for England, and 250 tons bars for France; this is the fifth consecutive advice under 1,800 tons, and seems to have imparted additional strength to the article." Messrs. GRENFELL & RICKARDS say; "The statement of exports and imports for the quarter ending 31st ult. shows that 10,000 tons more copper contents were imported than exported during that period; and as in the same time our public stocks in Egland only increased 4, 00 tons, and it is generally understood that consumers in Birmingham and elsewhere are rather bare of copper than otherwise, it would appear that home consumption has been very good since the commencement of the present year."

Tin.—The market continues very quiet. A sale of several thousand slabs of straits, at Boston, at 19¼c.@19½c., said to have been made several weeks ago, has come to light. This lot was sold to close up an estate. The foreign markets are nominally unchanged since our last report. We quote here: Straits, 20c.@20¼c., gold; L. & F., 19¼c.@19½c.; Refined, 20c.; Banca, 24c.@24½c. Messrs. JAMES & SHAKSPEARE, London, under date of the 9th inst., say: "English continues in small request and purchases can be made on easier terms. Foreign descriptions have again become very irregular and "bear" sales of Straits for forward delivery have been made during the week at low prices, but the bulk of the actual holders, especially of Australian, are unwilling to operate at the reduced values, and seem determined to wait until an improvement takes place before making further sales." The market for tin plates is rather quiet. The canners of corn, fruit, etc., have not yet come into the market, although the canners of oysters have made their appearance. We quote: I. C. charcoal at $9 5 @$9 75, gold; charcoal ternes, $8 50@$8 75; coke tins, $7 75@$8; coke ternes $7 25@$7 50.

Lead.—In domestic we note the sale of 90 tons of Selby from dock at 5·82½c., 30 days, and about 300 tons additional, of Western lead, in lots, at 5·80c.@5·85c., at which prices the market now stands. Western is offered freely at 6·85c. currency laid down here. Foreign is in very light demand and held at 6·62½c.

Spelter and Zinc.—We note sales of a lot of 10 tons of domestic spelter at 7c currency, and another lot of 20 tons at the same price; smaller lots have been sold at 7c.@7¼c currency. The Combination of Western Producers will meet at Chicago, next week, to establish prices for May. Although the combination is still maintained, yet there is not much confidence expressed in a continuation of the same. There is nothing doing in Foreign spelter. Sheet zinc is quiet, 9c., gold.

Antimony.—We learn of sales at 12½c. and quote at 12½c.@13c.

Quicksilver.—The market is still very unsettled Prices are as follows: This city, 89c.; San Francisco, 75c.; London, £14. 10s.

The San Francisco *Commercial Herald*, of April 8, says:

"From the quarterly statistics furnished by us a week since, it will be seen that local supplies are increasing quite rapidly, as compared with a like period in 1874. Exports to China and elsewhere are also on the increase. The *City of Tokio*, as before announced, carried 881 flasks to China and Japan. The price with us is more or less nominal, say 70c. to 85; in London, £15; in New York, 85c."

FINANCIAL.

New York Stocks.

April 21, 1875.

The New York stock market has been very active during the week, with a slight inclination, under liberal offerings, to lower figures; the market to-day closed firm at our quotations. The dealings in bonds exhibit an increase over the sales reported in our last, quotations, however, are not fully sustained.

The new seven per cent. coupon bonds of the Delaware and Hudson Canal Company, due in 1894, have been placed on the list of the Stock Exchange. The $2,000,000 of this loan negotiated by Messrs. MORTON, ROSE & Co., of London, are officially quoted on the London Stock Exchange.

Quotations are as follows:

	Highest.	Lowest.	Closing.
Pennsylvania Coal Co.	—	—	—
Consolidation Coal Co.	46	45¾	46
Spring Mt. Coal Co.	—	—	70
American Coal Co.	—	—	—
Maryland Coal Co.	—	—	18
Cumberland Coal and Iron Co.	—	—	—
N. Y. & Nova Scotia Iron Co.	—	—	—
Del., Lack & West. R.R. Co.	115¾	113¾	115¾
New Jersey Central R. R. Co.	113½	112	113
Delaware and Hudson Canal Co.	117¾	117	117¾
Quicksilver Mining Co, pref'd.	—	—	29¾
" " " Common.	21¾	20½	20¾
Mariposa Land & Mining Co.	6¾	5¾	6¾
St. Louis & Iron Mountain R. R.	23¼	21	21
Wilkes-Barre Coal Co.	—	—	—

Sales for the week, ending April 21st, inclusive, were as follows:

	Shares.	Price.
Del., Lack. and W. RR.	5,783	at from 113¾ to 115¾
Del. and Hudson Canal	407	" 117 " 117¾
New Jersey Central RR	1,123	" 112 " 113½
Quicksilver Mining Co.	4,550	" 20¾ " 21¾
Consolidation Coal Co.	250	" 45¾ " 46
Mariposa Land & Mining Co.	550	" 5¾ " 6¾
" Assessment paid	3,100	" 7 " 9
" Preferred	675	" 6 " "
Maryland Coal Co	200	" 18 ".....
St. Louis & Iron Mountain R. R.	1,050	" 21¾ " 23
Spring Mountain Coal Co	100	" 70 ".....
Quicksilver Mining Co., prefd.	100	" 29¾ ".....
Pennsylvania Coal Co.	....	" .. ".....
American Coal Co.	....	" .. ".....
Total Sales	17,880	shares.
Sales for the week previous	16,961	"
Increase	927	"

The following are the sales of bonds for the same period:

	Amount.	Price.
Del., Lack. & W. RR convertible,	$65,000	at from 115 to 115¾
N. J. Central RR. 1st consolidated mortgage bonds	27,000	" 105¾ " 106⅜
St. Louis & Iron Mount'n 1st Mtg bonds,	....	" .. ".....
St. Louis & Iron Mountain, 2d Mtg. bonds	1,000	" 57 ".....
N. J. Central 2d Mtg.	....	" .. ".....
" " 1st Mtg. N.	....	" .. ".....
Del. & Hudson Canal, 1st Mtg. Reg. bonds, 1891	....	" .. ".....
Del. & Hudson Canal, 7s, 1894.	34,000	" 105 " 106⅝
Del. Lack. & W. R. R., 2d Mtg.	8,000	" 111 " 111¾
C. & O. R.R. 1st Mtg. Coupon	....	" .. ".....
Total Sales	$135,000	

Philadelphia Stocks.

April 20, 1875.

The Philadelphia stock market has been generally steady during the week, the closing quotations were slightly in advance of our last, with a firm feeling. Transactions of both stocks and bonds exhibit quite a falling off from last week's dealing.

We note recent quotations of the Northern Liberties Gas Co. at 29¼.

The following stocks were sold at auction to-day, at the prices annexed: $3,000 of the Hancock Steel and Iron Co., of Danville, Pa. 1st mortgage coupons, 7/ guaranteed by the L. V. R. R., at 107 $2,000, do. do. at 106¾, 1 000 shares Globe Smelting Co, par $50—at ¾, 100 shares. Cambria Iron Co., at 17¼, 1,332 shares Moshannon Coal Co., at 1.40.

At the annual meeting of the stockholders of the Allegheny Valley R. R. Co., at Pittsburg, on the 19th inst, the earnings for 1874 were stated at $2,389,472, expenses, $1,470 784; net earning, $918,687. The receipts for 1873 were $2,697,238; expenses, $1,931,912; net earnings, $765,325; an increase of $153,361. The total paid up capital of this company, as per report of October 31, 1873, was $2,256,400. and the total of funded and floating debt at the same time was $5,214,691, of which nearly four millions bear 7 3-10 per cent interest and the remainder 7 per cent. Total length of road and branches, 262 miles.

Quotations are as follows:

	Lowest.	Highest.	Closing.
Reading R. R. Co.	56⅜	57	56⅝
Lehigh Valley R. R. Co.	62¾	63⅛	63⅜
Little Schuylkill R. R.	49⅞	49¼	49¼
Catawissa R.R.	20⅜	21⅛	20⅛
" " Preferred	—	—	43⅞
" " New Preferred	—	—	—
Huntingdon and B. T. R.R.	8	8⅛	8
" " " " Preferred.	—	—	15
Minehill R.R.	—	—	53⅝
Lehigh Coal and Navigation Canal	50¾	51⅜	50⅝
Morris Canal	—	—	51
" Preferred	—	—	—
Pennsylvania Canal	—	—	—
Schuylkill Navigation Canal	—	-	7⅜
" " Preferred	—	-	14⅞
Susquehanna Canal	—	-	7
Westmoreland Coal Co	—	—	—
Buck Mountain Coal Co	—	—	32
Cambria Iron Co	—	—	17½
Locust Mountain Coal Co.	—	-	-
Emaus Iron Co	—	-	36
Crane Iron Co	-		

The following are the aggregate sales of stocks for the week ending April 20:

	Shares.	Price.
Reading Railroad	1,313 at from	56½ to 57
Lehigh Valley RR. Co.	675 "	62¾ " 63⅜
Little Schuylkill RR.	53 "	49⅞ " 49¼
Catawissa RR.	200 "	20½ " 21¼
" " preferred	100 "	43⅝ " —
" " new preferred	— "	— " —
Huntington & B. T. R. R.	110 "	8 " 8⅛
Huntington and B. T. RR., p'f'd.	102 "	15 " —
Minehill RR.	28 "	53⅝ " —
Lehigh Coal and Navigation Canal.	1,174 "	50¾ " 51¾
Schuylkill Navigation Canal.	6 "	7⅜ " —
" " " p'f'd.	60 "	14⅞ " —
Morris Canal,	10 "	51 " —
Susquehanna Coal Co.	.... "	— " —
Cambria Iron Co.	200 "	17½ " —
Pennsylvania Canal.	.... "	— " —
Susquehanna Canal.	.... "	— " —
Emaus Iron Co.	18 "	36 " —
Buck Mountain Coal Co	.... "	— " —
Total sales	4,039 shares.	
Sales for the week previous	10,405 "	
Decrease	6,366 "	

Sales of the various bonds for the period under review have been as follows:

	Amount.	Price.
Reading RR. 6s, 43 or 44, or 48—80	$4,000 at	102¾ 10
Catawissa RR., new 7s	.... "	— "
H. and B. T. RR., 1st mortgage, 7s	3,000 "	104¼ "
Lehigh convt. gold loan	.... "	.. "
Pa. and N. Y. Canal, 7s	1,000 "	106¼ "
Schuyl. Nav. 6s, '82	2,200 "	80 " —
L. V. RR. 6s, coup	4,000 "	105 "
H. and B. T. 1st Con. bonds	19,000 "	57 "
R. C. and I. Co. irregular mort. bonds, Hill Tract	.... "	.. "
Lehigh Nav. 6s, 1884	4,300 "	101½ " 102
Reading RR. debenture bonds	3,200 "	80 " 81
" " R. G. M. 7s, reg.	1,000 "	107½ "
" " new convertible 7s	13,800 "	107½ "
" " 7s, 93	6,000 "	106 "
Reading C. and I. Co. debenture bonds,	.... "	.. "
Reading C. and I. Co. mort. bonds, Tamaqua Tract	4,000 "	90½ "
Reading C. and I. Co. mort. bonds, St. Clair Tract	.... "	.. "
R. C. & I. Co, Wetherill tract	.... "	.. "
" " " " Locust Mountain Summit Improvement tract	.... "	.. "
R. C. & I. Co, Helfenstim tract	.... "	.. "
Lehigh Valley RR. 6s, registered	.... "	.. "
" " " 7s	2,000 "	108½ "
Lehigh Coal & Nav. Co. 6s, gold loan	3,500 "	102 "
" " " " 6s, RR. loan	.... "	.. "
Schuylkil Nav. 6s, '95	1,000 "	79½ "
" " 7 per cent. boat loan	3,000 "	92 " 93
" " 6s, '72	2,000 "	95¼ "
" " Div'd scrip	.... "	.. "
R. C. & I. Co., Gleutworth tract	.... "	.. "
Chesapeake & Delaware Canal, 6s	.... "	.. "
Susquehanna Canal, 6s	.... "	.. "
Pennsylvania Canal, 6s	.... "	.. "
Shamokin Valley & Pottsville R.R., 7s.	.... "	.. "
Allegheny Valley 7 3-10s	2,000 "	94¼ " 94½
" " " Eastern Exte'n.	.... "	.. "
" " " 7s	1,000 "	85 "
Del. Div. Canal, 6s	.... "	.. "
Total Sales	....	$80,000

Gold and Silver Stocks.

SAN FRANCISCO, April 21, 1875.

The San Francisco stock list is very irregular, with the tendency to lower figures. Raymond and Ely is the only item to be noted as a prominent exception. Our report placing it at $57 per share, being the highest figure which this stock has attained during the month. The Eureka Consolidated Mining Co. has declared its regular monthly dividend of 50 cents per share, payable on the 5th inst.

Quotations, April 21, 1875:

Gould & Curry	19	Raymond & Ely	57
Savage	136	Eureka G. V.	8
Chollar Potosi	66	Best & Belcher	53
Ophir	114	Kentuck	16
Hale and Norcross	42	Meadow Valley	8
Crown Point	37	Alpha	24
Yellow Jacket	84	Sierra Nevada	14
Belcher	37	Union Consolidated	8
Imperial	9	Mexican	30
Consolidated Virginia	453	Caledonia	21
California	65	Silver Hill	11
Overman	67		

Copper Stocks.

BOSTON, April 22, 1875.

Copper stocks, without exception, have taken a decided advance; the most remarkable feature of the report is the advance of Allouez which is placed at $10¾ per share, or over 100 per cent. in advance of our last quotations. The sales during yesterday's operations of the Board were as follows: 200 shares Allouez at from 17¾ to 19, 13 shares Calumet and Hecla at 151, 25 shares of Quincy at 39, 100 shares of Ridge at 7¾, 325 shares of the Franklin Mining Co. at from 11⅞ to 12, 150 shares of Pewabic at 7¾, and 125 shares of Pethcrick at 13¾; 200 shares of the Star Mining Co. sold at 50 cents per share, 200 shares of the Superior Mining Co. sold at 30 cents per share, and 300 shares of the Eagle Mining Co. also sold at 30 cents per share. We note a recent sale of the Duncan Silver Mining Co., at 50 cents per share, and also of the Menard Mining Co. at 80 cents per share.

Quotations are as follows:

Allouez	21	National	—
Calumet and Hecla Co.	150	Phœnix	13
Copper Falls	9	Quincy	39
Central	30	Ridge	7¾
Franklin	—	Rockland	1

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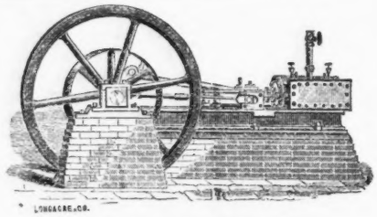

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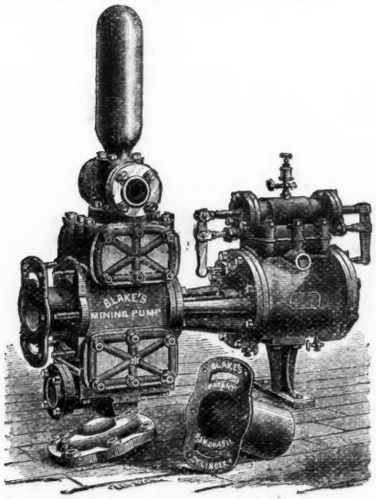

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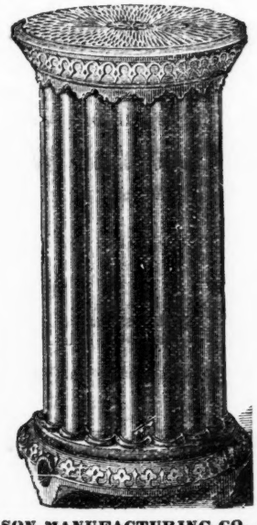

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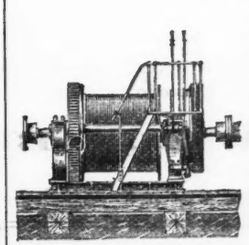

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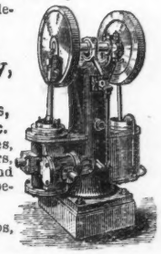

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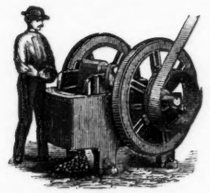

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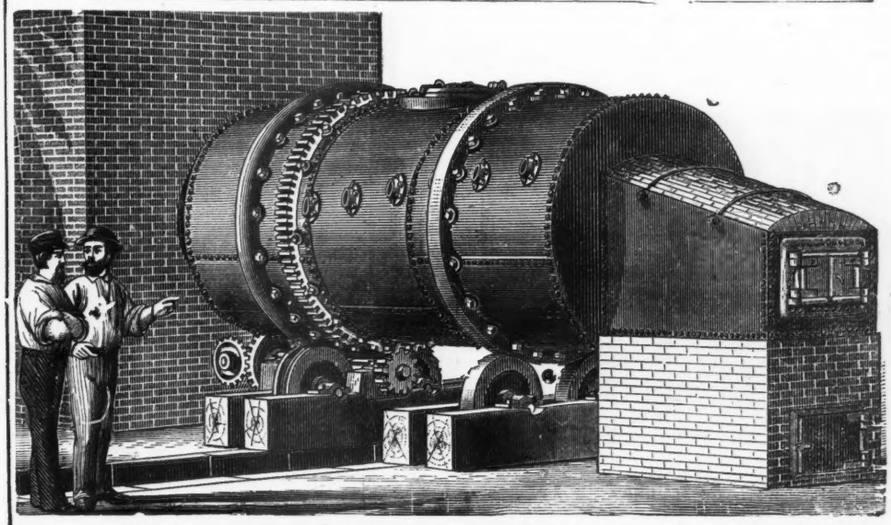

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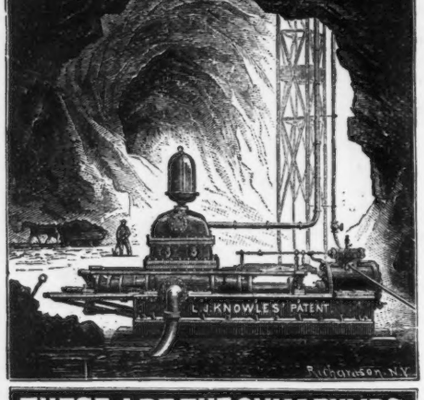

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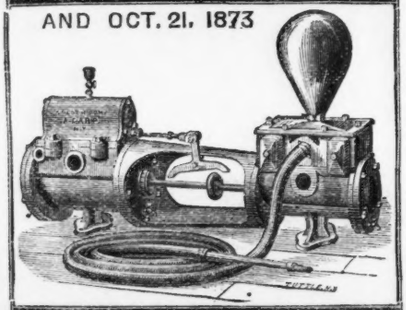

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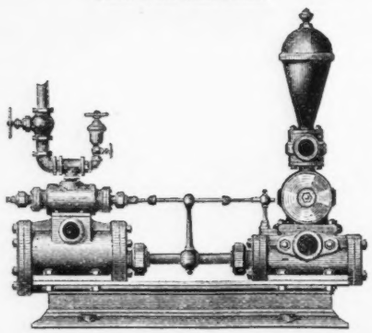

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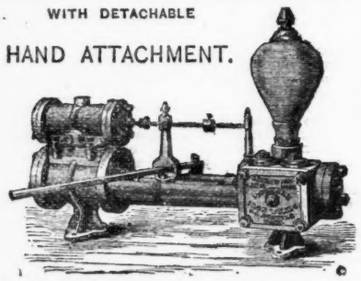

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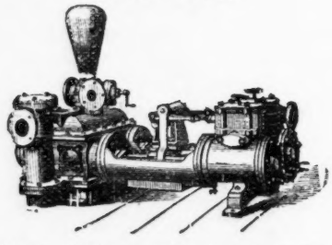

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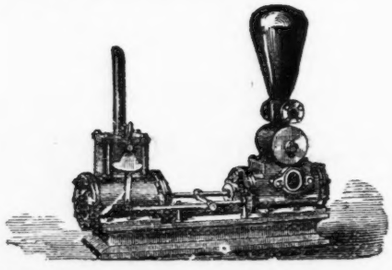

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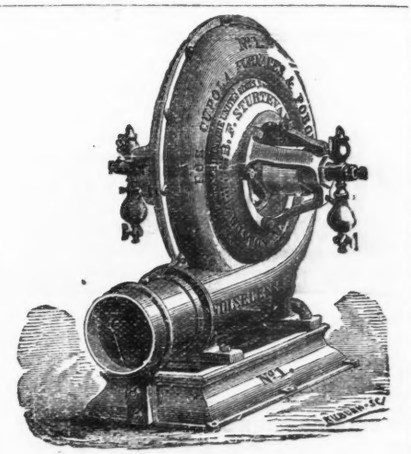

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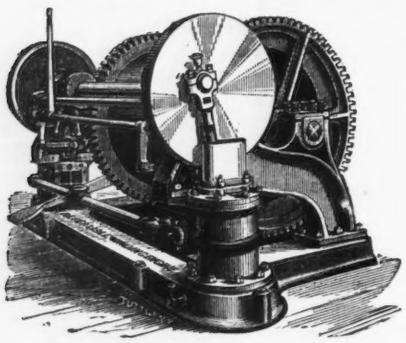

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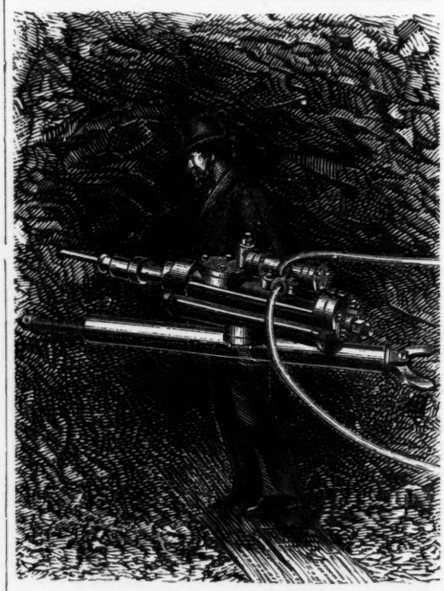

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